WILD LIFE MANAGEMENT IN INDIA DURING 1990 TO 2000 AN ANNOTATED BIBLIOGRAPHY

DISSERTATION

SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS FOR THE AWARD OF THE DEGREE OF

Master of Library & Information Science

1999-2000

BY

SHALINI SHARMA

Roll No. 99 LSM 17
Enrolment No. BB 9032

Under the Supervision of

Miss. NISHAT FATIMA
LECTURER

DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE
ALIGARH MUSLIM UNIVERSITY
ALIGARH (INDIA)

Dedicated

to my

Husband

Phones : (0571) 400039
Intemal 193
Telex : 564 - 230 AMU IN
Fax : 91 - 0571- 400528

DEPARTMENT OF LIBRARY & INFORMATION SCIENCE

ALIGARH MUSLIM UNIVERSITY, ALIGARH-202002 (U.P.), INDIA

Miss Nishat Fatima

Dated .....

CERTIFICATE

This is to certify that ***Mrs Shalini Sharma*** has completed her dissertation entitled "***WILDLIFE MANAGEMENT IN INDIA DURING 1990 TO 2000***" an Annotated Bibliography. In partial fulfilment of the requirements for the degree of ***Master of Library and Information Science***. She has conducted the work under my supervision.

(Nishat Fatima)

CONTENTS

ACKNOWLEDGEMENT

I the name of **Almighty**, the most beneficient and merciful.

First and foremost, I would like to place my everlasting gratitude to **Almighty God**, most benevolence, who provided me all the necessary strength and guidance for the timely completion of this dissertation.

This work is suggested and supervised by my teacher **Ms. Nishat Fatima**, Lecturer, Department of Library & Information Science, Aligarh Muslim University, Aligarh. I feel great pleasure to express my deep sense of gratitude for her encouragement, guidances and the precious time she spared in completing this work.

I am grateful to **Mr. S. Mustafa Zaidi**, Chairman, Department of Library & Information Science, for his wise councel and cooperation.

I am equality thankful to **Prof. Shabahat Husain**, Department of Library & Information Science, and other members of the department for their time to time helpful suggestions.

I am very thankful to **Mrs. Nasreen**, the Senior Librarian of Department of Wildlife and Ornithology for providing me required materials during the period of collecting of materials. I am thankful to my friends and non-teaching staff, especially Seminar Incharge **Riaz Abbas** and **Mohd Asrar** of the Department of Library & Information Science and Department of Wildlife and Ornithology, A.M.U, Aligarh.

Words fail me in expressing my regards to my parents who have instrumental for making my career.

I am very thankful to my husband **Mr. K.M. Sharma** who gave me courage, suggestions and full help to complete my dissertation work time to time.

Last but not the least I would like to express my thanks to **Mr. Mohd Riaz Khan** for data entry of this manuscript neat and clean in the utmost time.

Shalini Sharma.

[SHALINI SHARMA]

AIMS SCOPE AND METHODOLOGY

AIMS AND SCOPE :

Now-a-days our society is facing very big problem related to evironment. Environental problems is increasing due to cutting the 'jungles', hunted the animals and misuse the natural resources. So having seen this emerging problem. I have taken this topic **"Wildlife Management in India During 1990 to 2000"**. I have specified the problem in decade. To attract the people's attention towards the problems of jungles and animals and their management. During this decade the problem of misuse of natural resources have taken a huge shape.

The scope of wildlife management is very wide. Widlife management includes flora and fauna and other many concepts shared with several sciences and other professions.

The present work is endeavoured to study in the form of annotated bibliography a selection of relevant literature dealing with wildlife management in India during 1990 to 2000, published in different journals. The bibliography selective in nature. Hence, an attempt has been made to

cover all the relevant aspects of the present study.

The present work will be helpful for the purpose of the research as well as general people.

METHODOLOGY :

In order to complete this task secondary sources such as Guide to Indian Periodical, primary sources and other magazines on wildlife management in India have been consulted and these are available in --

1. Maulana Azad Library, A.M.U. Aligarh.

2. Wildlife and Ornithology Department, A.M.U. Aligarh.

3. Botany Department, A.M.U. Aligarh.

STANDARD FOLLOWED :

The Indian standard recommendations for bibliographies reference (IS: 2381-1963) and classified catalogue code have been followed. The items of bibliographical references for each entry of periodical are arranged as follows –

a Name(s) of Author(s)

b a full stop (.)

c Title: Subtitle, if any

d A full stop (.)

e Title of periodical in full (underlined)

f A full stop (.)

g Volume number in IAN

h A comma (,)

i Issue number

j A semi colon (;)

k Year of publication

l A comma (,)

m Month of publication

n Date of publication

o A semi colon (;)

p Inclusive pages of article

q A full stop (.)

SPECIMEN ENTRY :

SINGH (H.S). Evaluation Criteria for determining priorities for Wildlife conservation. The Indian Forester. 123, 10; 1987, Oct; 879-86.

ABSTRACT :

Each entry is followed by an abstract of the article. Abstract given are informative in sense not in length.

INDEX :

The index part contains an author index and title index. Each index guides to the specific entry of entries in bibliography by the help of entry number(s).

SUBJECT HEADINGS :

Attempt has been made to give co-existesive subject heading as much as possible. It will facilitate the readers to find out desired article(s) from this bibliography.

PART -1
INTRODUCTION

INTRODUCTION

India has a awakened to long forgotten interest in wildlife that it appears to be a new interest together, Kautilya mentions of Abhayaranya where nature and wildlife was strictly protected from interference by man. International attraction has been focussed on the problem in developed and developing countries by the International Union for Conservation of Nature and National Resources and India is fortenate to have also awakened to the need for nature conservation.

With big cities deserts of brick and marter coming up due to concentration of population these in apart from the growing population of the country greater need is felt for creation of National Parks and Sanctuaries, so that man could seek solace form the nerve racking occupations and enjoy the beauties of nature there are other problems of scientific research and progressive land use involved as well as the preservation of our precious wildlife heritage.

The wildlife preservation society of India has been seized of the problem form its very inception and inspite

of very limited resources it has been playing its role for the cause with credit.

WILD LIFE :

It includes the general things of National wildlife, such as conservation of wild life, census, National parks and Reserve zoos etc.

There is no word for wild life in the oxford Dictionary-the American dictionary webester defines wild life as 'living thing that are neither human non domesticated, especially Mameels, Birds, and fishes hunted by man'.

The modern concept of wild life includes all kinds of life sustained in the forest and in the water which includes animals, birds, fishes, insects and plants.

In recent times for the vigorus protection of environment and prevention of extinction and studies of all kinds of flora and fauna has been included in the purview of wild life.

WILD LIFE SPECIAL :

Fauna : Fauna covers vertebrates such as Amphibians,

Birds, Mammals, Pisces and Reptiles.

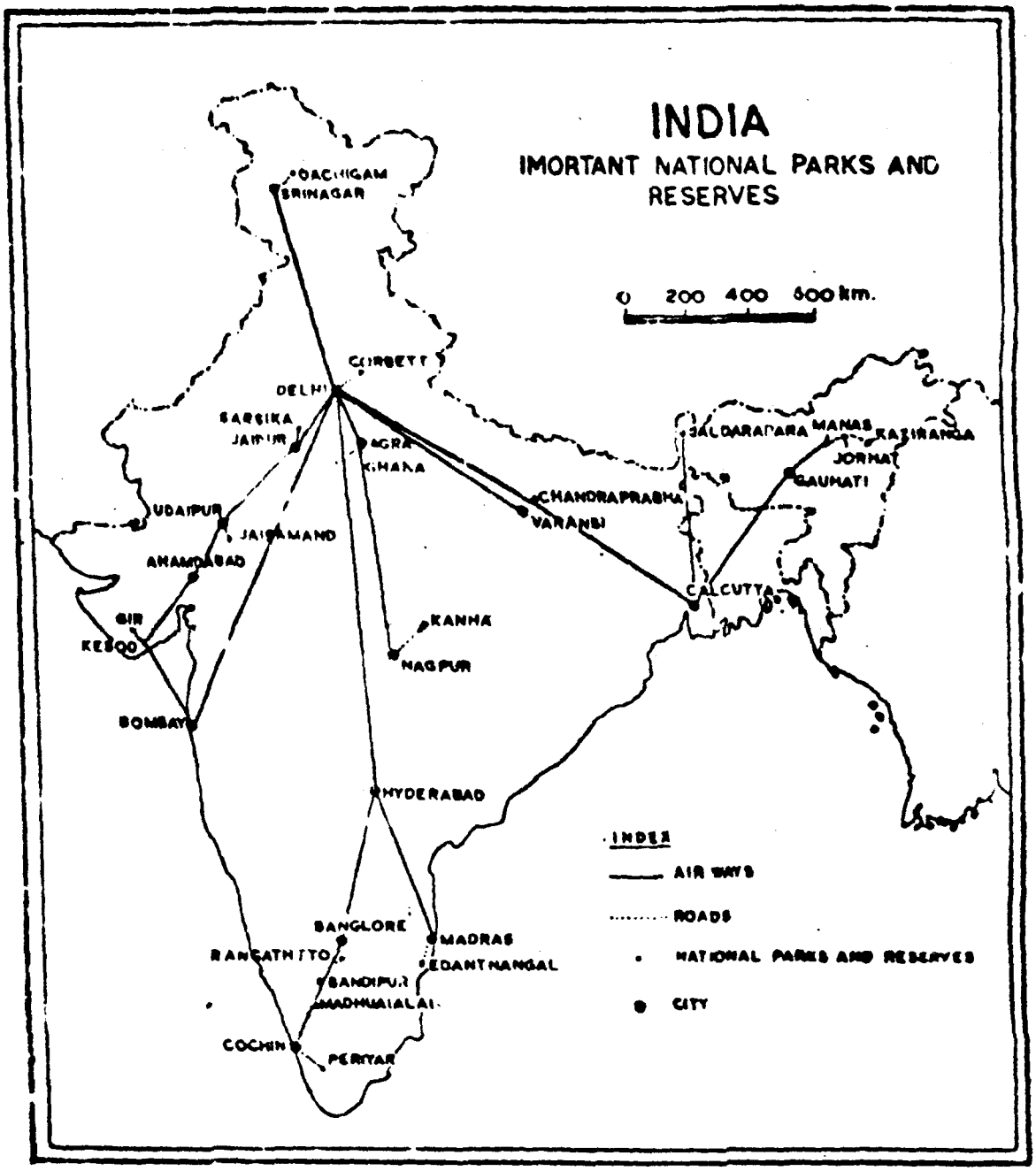
Flora : It covers forest reserve and plant conservation.

WILDLIFE MANAGEMENT

Wild life management is the science and art of making decisions and taking actions to manipulate the structure, dynamics, and relations of populations, habitats, and people to achieve specific human objectives by means of the wildlife resource. Sanctuaries and National Parks have been created for exclusively protecting the wild flora and fauna in all parts of the world and in India, as a part broad wild-life management prospective. Under the Wild Life (Protection) Act, 1972, the State Governments are empowered to declare any area as a Sanctuary or a National Park for the purpose of protecting, propagating or developing wild-life or its environment.

THE CONCEPT OF WILDLIFE MANAGEMENT :

Wildlife management is
the science and art
of making decision and taking actions to manipulate
the structure, dynamics, and relations
of population, habitats, and people
to achieve the specific human objectives
by means of the wildlife resources.


INDIA
IMORTANT NATIONAL PARKS AND RESERVES
0 200 400 600 km.
DACHIGAM
SRINAGAR
CORBETT
DELHI
SARSIKA
JAIPUR
AGRA
KHANA
JALDAPARA
MANAS
KAZIRANGA
JORHAT
GAUHATI
CHANDRAPRABHA
VARANSI
UDAIPUR
JAISAMAND
AHAMDABAD
CALCUTTA
GIR
KANHA
KEOOO
NAGPUR
BOMBAY
HYDERABAD
INDEX
AIR WAYS
ROADS
NATIONAL PARKS AND RESERVES
CITY
BANGLORE
MADRAS
RANGATHITTO
VEDANTHANGAL
BANDIPUR
MADHUMALAI
COCHIN
PERIYAR

SANCTUARIES AND NATIONAL PARKS :

Sancturaries and national parks have been created for exclusively protecting the wildflora and fauna in all parts of the world and in India, as a part of broad wild-life management prospective. Under the Wildlife (Protection) Act, 1972, the State Governments are empowerd to declare any area as a sanctuary or a national parks as per the procedure laid down, for the purpose of protecting, propagating or developing wildlife or its environment. In India there are 19 National Parks comprising an area of about 6471.22 sq. km. and 202 sanctuaries stretched over an area of 69,292 sq. km. The total area under sanctuaries and national parks comprises 19% of the reserved forest area of the country and 2.3 percent of the total geographical area. Ane xpert committee hasrecommended that about 4% of the total geographical area should be brought under National Parks and Sanctuaries.

SANCTUARIES :

Under section 18 "*The State Government may, by notification declare any area to be a Sanctuary if it*

considers that such area is of adequate ecological, faunal, floral, geomorphological, natural or zoological significance, for the purpose of protecting, propagating or developing wildlife or its environment.

NATIONAL PARKS :

Under section 35 "*whenever it appear to the State Government that an area, whether within a sanctuary or not is by reason or its ecological, fauna, floral, geomorphological or zoological association or importance, needed to be constituted as a National Park for the purpose of propagating or developing wildlife therrein or its environment it may, by notification, delcare its intention to constitute such area as a National Park.*

MANAGEMENT OF NATIONAL PARKS AND SANCTUARIES :

The basic and the main aim of the management of National Parks and Sanctuaries is to improve, maintain and preserve the environment in and around such areas, so that wildlife and the natural flora and fauna occupy their natural habitat and live and grow in the optimum living conditions.

It involve protection of forest areas, soil conservation, watershed management studies and a continuous vigil and strict watch over the security of the wild animals.

The protection of the boundaries of Sanctuaries and National Parks is necessary for the non-disturbance of wildlife. The management of National Parks and Sanctuaries has acquired specific significance from the point ofview of wildlife tourism.

SCOPE OF WILDLIFE MANAGEMENT AS A NATURAL RESOURCE :

Natural resources are the things provided by nature to human for their use. Natural resources can be subdivided into Renewable and Nonrenewable. It also draws a line between those that are constantly and continuously restored or reproduced y ongoing natural processes and those that can not, i.e. living or non-living. For example, Coal, Minerals and Petroleum are non-living or nonrenewable natural resources and if exploited at the increasing rate are likely to end more sooner never to reoccur in the near too distant future. On the other hand, wild life is a renewable natural resource. With proper management and care or

under normal natural circumstances, will reproduce itself. The protection of environment or the nature is itself linked with the future of human race. So, the scope of Wild Life management is very vast from the view of point of an economist, management includes efficient utilization of the natural resources to the maximum human benefit, through the process of scientific studies of the population of these animals and their habitat pattern.

Wild Life management is the judicious use of the Wild Life resources towards the attainment of scientific, ecological, economical, ethical, aesthetic and recreational objectives for the benefit of human beings.

IMPORTANCE OF WILD LIFE MANAGEMENT

Certain wild species known as wild resources, are important because of their actual or potential economic value. Wild resources that provide sport in the form of hunting or fishing are known as game species. Wildlife provide people with a wide variety of direct economic benefits as sources of food, spices, favoring agents, scents, soap, cooking oil, lubricating oil, waxes, dyes, natural

insecticides, paper, fuel, fibres, leathers, fur, natural rubber, medicine, fire wood etc.

Most of the important crops that supply 90 percent of World food today were once wild plants in the tropics. Other wild species may be needed for agriculture scientists to develop new crop grains to get higher yields and increased resistance to diseases, pests, heat and drought. Pollination by insects is essential for many food and non food plant species. Predatory insects, parasite and microbial pathogens are increasingly used for biological control of various weeds and pest, thus keeping the loss of crops and trees under control.

About 40 per cent of drug used throughout the world have active ingredients extracted from plants and animals. Many animals are used to test drugs and vaccines and to increase our understanding of human health and diseases. The nine banded Armadillo is used to study leprosy and prepare a vaccine for the disease. An estimated 10 per cent of World's marine species contain anti-cancer chemicals. Very little is known about 20-30 million undiscovered species. Less than 1 per cent earth's discovered species

have been thoroughly studied to determine their possible usefulness. Loss of this biological and genetic diversity reduces our ability to respond to new problems and opportunities.

I- *RECREATIONAL SIGNIFICANCE* :

Wildlife provides recreation to general public. Hunting was permitted in the past but due to misplaced enthusiasm many wild animals have been killed in our country on an account of over-hunting. However, Sanctuaries and National Parks provide place for recreation and attract public during holidays.

II- *ESTHETIC SIGNIFICANCE* :

Values which pertain to in-born natural beauty and artistic appreciations are grouped under this. Such values may overlap with other categories also, Since many wild animals have some esthetic appeal. This is almost an intangible value which may be difficult to measure or compare but never the less it is important and as for as conservation is concerned, it plays a major role.

III- *EDUCATIONAL AND SCIENTIFIC SIGNIFICANCE:*

Wildlife is important for teaching and learning. Many students of nature and others from general public are attracted towards wild animals and they learn about their habits, behavior and other attributes. Wild animals have a great popular appeal and many large species of mammals and birds can serve as models for illustrating certain basic scientific principles.

IV- *UTILITARIAN SIGNIFICANCE:*

This is one of the most important values of wildlife and can be considered as a practical one. Many of our domestic livestock may become highly specialized through selective bredding as a result of which they may be able to survive only under selected environmental conditions; under such situations, cross breeding with the wild variety can result in new blood lines and these may prove useful to our society.

V- *ECOLOGICAL SIGNIFICANCE* :

The important contribution of wild species may be their role in maintaining the health and integrity of the

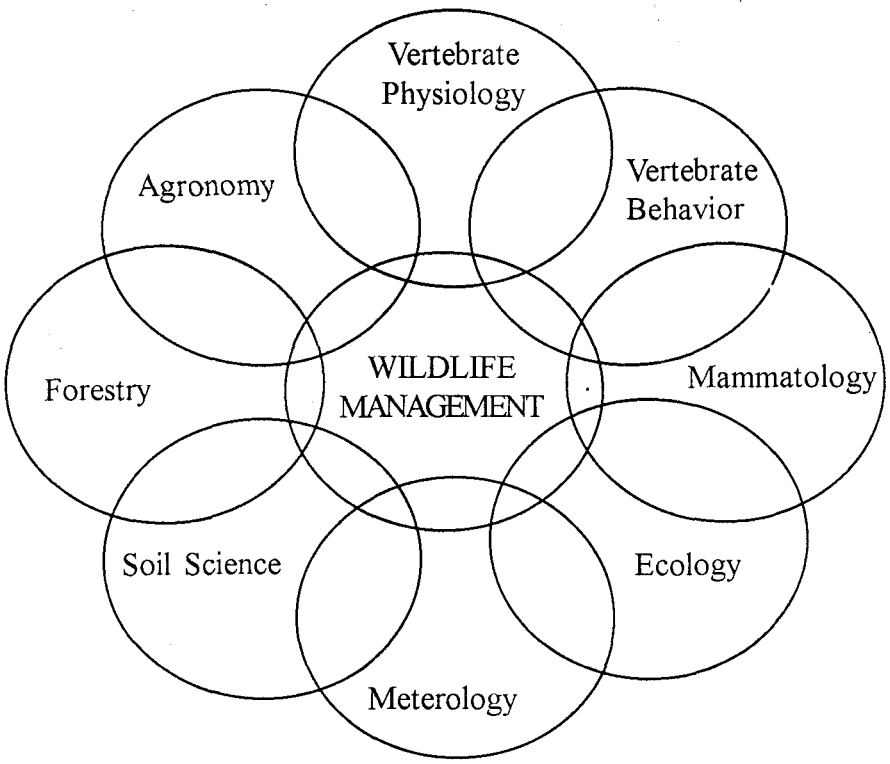
world's ecosystems. Ecosystem services of wild plant and animals on land and in these a include, production and maintenance of oxygen, othergases in the atmosphere and in water, filtration and detoxification of poisonous substances, moderation of earths climates, water cycles,decomposition of wastes, nutrient recycling, soil fertility, crop pests, diseases, photosynthesis, fossil fuel etc.

VI- *COMMERCIAL SIGNIFICANCE* :

Many wild animals and their derivates are valuable commercially. Trade in endangered species and their derivates is strictly regulated by the Wildlife (Protection) Act, 1972. Many species which have fur are commercially important in the world market. In North America and in several other countries fur bearning species are extremely important commercially.

PRINCIPLES OF WILDLIFE MANAGEMENT :

Principles of wildlife management are concepts to consider in formulating management objectives and in reaching management decisions. Principles do not tell the wildlife manager what to do; they are concepts to consider



DIAGRAM

The principles of wildlife management, portrayed by the central circle, include many concepts shared with several sciences and other professions, only a few of which are shown in this diagram. Widlife management requires application of an abundance and diversity of information and is one of the most complex of occupations.

when deciding what should be done. Application of these principles to management requires a knowledge of biology and an ability to think analytically. Principles have broad application and must be applied by biologists. Principles are neither unchallengeable nor unchanging. They may be widely accepted today and become expanded, modified or discarded and replaced, as new knowledge provides new insight. There are given principles of wildlife management as follows --

P1.1 Wildlife includes all free-ranging vertebrate animals in the naturally associated environment that have determined their evolution.

P1.2 Wildlife conservation is a dynamic social process that defines and seeks to attain wise use of wildlife resources. While maimtaining the productivitiesof wildlife habitats. This process is strongly influenced by practices and attitudes of the past. It includes the professional activitiesof management, research, education, administration and law enforcement. Laymen, especially organized groups, participate in wildlife conservation through a continuous political

process that defines and redefines wise use.

P2.1 Conservation of wildlife resources is intimately related to conservation of all other natural resources. Conservation is influenced by society's needs, ideals, and morals and by its definition of a quality life for humans.

P2.2 Quality living requires that individuals be free to choose from a variety of life eperiences and opportunities for self-expression. A diverse environment, including wild lands and wildlife, is necesary to provide these opportunities. A society's ability to provide a diversity of opportunities for personal experience and self-expression is determined by its resources, knowledge, attitudes, conservation, all in relation to its population size.

P2.3 Goals for the management of a publicly owned resource are determined through a political process. Wildlife biologists employed by public agencies are expected to predict wildlife responses to land management and to interpret these responses and

their implications for realizing wildlife values, so that the public's definition of wise use is not made in ignorance.

P3.1 Wildlife have served values - commercial, recreational, biological, scientific, social, aesthetic, and negative, commercial, recreational and negative value can be measured in marketing terms. The other values are difficult or impossible to measure. Since wildlife values are not commensurable, the total value of a wildlife population can only be estimated by its cost of replacement.

P3.2 Peoples' perceptions of and attitudes toward wildlife values are highly varied. Attitude groups include laissez-faire groups, sentimentalists, protectionists, single-use adherents, and multiple-use adherents. An effective wildlife management billogist must recognize, understand and communicate with a diversity of people who influence land management.

P3.3 Personal appreciation of wildlife values develops as

individuals learn more about wildlife and ecology. Public realization of wildlife values may be increased not only by producig more wildlife but also by teaching wildlife ecology, so that people may recogize and appreciate more value in existing wildlife populations.

P3.4 In the United States, four major problems involving wildlife valuation are (1) a need to consider all wildlife values in decisions affecting land use. (2) a need to develop sources of financial support for managing nongame and noncommercial populations of wildlife. (3) a need for methods to compensate landowners for wildlife values produced and realized on private land, and (4) a need for broader public awareness of the importance of habitat as necessary for sustaining wildlife population.

P4.1 Wildlife biologists manage land ecosystems supporting a great variety and abundance of plants and animals that are interrelated in many complex ways, including -- butnot limited to -- food webs and competition. The complexity of an ecosystem

managed by a wildlife biologist is atleast as great as that of any system managed by any professionl. This complexity defies complete understanding, limits confidence in predictions, and requires caution in management prescriptions.

P4.2 Wildlife animals have numerous anatomical, physiological and learned and genetic behavioral adaptations that enhance their abilities to live in certain ways in certain kinds of environments. Adaptations determine a species' habitat requirements. Adaptations are equally limitations, and some species are highly specialized and, therefore can exist in only a narrow range of habitat conditions. Such species are especially sensitive to habitat alteration.

P4.3 Competition is mutual use of limiting habitat resources by two animals or populations. Species having evolved together tend to be ecologically separated. So that their functional and resource which do not overlap completely, and competition is needed or avoided.

P5.1 Soil is our most basic land resource. Soils vary greatly in fertility and fragility. Any land-use practice that degrades soil fertility also degrades its ability to produce any organic resource including wildlife.

P5.2 Within suitable habitats, wild animals achieve higher quality, and wildlife populations are larger and more productive on the more fertile soils. As with all organic resources, the benefits of wildlife management can be greater on fertile soils than on infertile soils.

P5.3 Human use of the land tends to be most intensive on areas having the most fertile soils. The intensity of agriculture, forestry, and range management on the most fertile soils usually reduces the variety of food and cover resources available to wildlife and makes these areas less suitable or unsuitable as wildlife habitat. On soils of moderate fertility, extensive agriculture, forestry, and range management often increase the variety of habitat resources and improve wildlife habitat.

P6.1 Good nutrition enhances wildlife production and reduce wildlife susceptibility to many forms of mortality. Quality wildlife foods are digestible and provide water, energy and several required nutrients.

P6.2 The quantities and qualities of foods required by wildlife are highly variable among species of wildlife, among the sex-age classes of animals, among seasons and related physiological functions of animals, and among weather conditions and geographic regions. Food shortages are not uncommon among carnivores. Herbivores have strong forage preferences related to forage quality. Herbivores tend to experience nutritional problems, not for lack of forage, but whenever available forage is of poor quality.

P6.3 The quantities and qualities of food available to wildlife are highly variable among areas, seasons, and years. Food quantities are influenced by weather and many site factors. For herbivores, forage qualities are influenced by weather, site

factors, genetics of plants, and the parts of plants eaten.

P6.4 Full understanding of the nutritional dynamics of wildlife requires periodic assessment of food abundance, analysis of forage qualities, study of food habits and preferences, and study of the nutritional physiologies of wildlife species. Biologists seldom have full understanding of the nutritional dynamics of wildlife populations they manage.

P6.5 Most wildlife fulfill their nutritional needs by using a variety of foods that support both sexes and all age classes during all seasons and whether conditions. To encourage certain wildlife populations, biologists develop habitats providing this variety of foods. Without a full and detailed understanding of the nutritional dynamics of a desired wildlife population, biologists develop habitats that (1) emphasize the naturally associated environment of the species, (2) provide a diversity of potential foods, (3) provide foods known to be

preferred, and (4) provide foods that will alleviate any detected nutritional deficiencies.

P6.6 Water may be a serious limiting factor for wildlife populations in arid areas. Seasonal concentrations of wildlife around limited water sources can result in local damage to forage resources and can enhance transmission of disease. Wildlife may also be compelled to use water sources in areas where their vulnerability to predation is great.

P6.7 Wildlife exhibit a variety of adaptations to arid environments, and water needs vary greatly amog species -- with weather conditions, and according to seasonal water requirements for reproductive funtions. Water supplies vary greatly among years, seasons and areas.

P6.8 Enhancement of water supplies can be a sucessful habitat management tool if water is a limiting factor, if any other equally limiting factors are also alleviated, and if the enhanced water supply is acceptable to the animals.

P7.1 Cover for wildlife can be any structural resource of the environment that enhances reproduction and/or survival by providing for any natural function such as breeding, escape, travel, or visual communication.

P7.2 Cover requirements of wildlife vary among species, among sex-age classes of animals, with seasons and weather conditions, according to the prevalence of predators or pests, and among geographic regions. Some species are specialized in their evolved requirements for cover and, therefore, are limited, atleast seasonally, to a narrow range of cover conditions.

P7.3 The cover resources of a habitat vary with land-use practices, because of natural disturbance and biotic succssion, and with seasons and weather conditions. A complete habitat for a wildlife species provides the varios cover resources needed for all natural functions by all sex-age classes throughout the year and during all weather conditions.

P7.4 Cover resources vary in quality. Animals have evolved preferences for types of cover in which they function most successfully. Biologists evaluating cover accept rates of preference and success as measures of cover quality. Cover is also analyzed by measuring structural and/or micro-climatic components that are correlated with cover quality.

P8.1 Wildlife exhibit a great diversity of movement patterns, ranging from sedentary species on small year-round home ranges to species that establish seasonal home ranges, sometimes along migration paths extending thousands of miles. All habitat resources needed by an animal must be juxtapositioned within its home range, but no home range can be larger than an area determined by the animal's cruising ability. Limiting habitat resources often occur in a small but critical partof the home range.

P8.2 In territorial species, animals defend at least part of their home range against intrusion by

conspecifics. Usually, the young of territorial species disperse from the territories of their parents. This mechanisms limits use of habitat resources within territories and provides an annual surplus of dispersing animals to colonize any suitable, unoccupied habitats.

P8.3 Migratory wildlife have genetric or learned traditions for annually returning to seasonally used home ranges. Imprinting of young animals to new natal areas within suitable but unoccupied ranges has been a successful tool for reestablishing extirpated populations and for extending geographic ranges.

P8.4 Migratory movements of wildlife are influenced by genetics, by learning, and by environmental factors, especially photoperiod and weather and food availability. Management efforts should be coordinated through out the migration routes of populations, such as the major flyways of birds. Within many species, there are subpopulation with differing migration patterns, creating complex

populations that are often difficult to distinguish and measure. Management is complicated whenever these sub-populations intermingle seasonally but are influenced by different environments for part of each year.

P8.5 Awareness of the zoogeographic history of a wildlife species can enhance understanding of its ecological adaptations and limitations, its requirements for habitat resources, and its abilities to withstand competition in various environments. Although natural barriers, especially climate and salt water, have delayed dispersal of terrestrial vertebrates, the dominant pattern of the past has been for successive newly evolved taxa to disperse and replace, rather than supplement, existing fauna. Thus, transplants of competing animals from other continents present a threat of ultimate extinction to elements of a native fauna. This threat is greatest when animals are transplanted from continents onto oceanic islands where faunal diversity and competition havebeen low.

P9.1 Reproductive success is critical to the maintenance, increase, and productivity of every wildlife population, and the monitoring of reproductive success is an important management function. There is great variation among species in biotic potential, sex relations, and seasonal patterns and processes of reproduction. Therefore, strategies for monitoring reproductive success and for managing populations will depend on knowledge of the reproduction characteristics of the species being managed.

P9.2 For each wildlife species, the reproduction process has many components that occur in sequence. Numerous environmental factors may influence the prcoess at each stage, so there are many potential causes of an observed failure of reproduction. The relative roles of these factors influencing reproduction can vary among population and among time periods.

P9.3 Several environmental factors that may inhibit reproductive success may become more intense as

population densities increase relative to habitat resources. As a result, rates of reproductive success tend to be ecological density dependent; that is, they tend to decline as ecological density increases. Under these conditions, total reproduction per year is greatest at intermediate levels of ecological density with intermediate, rather than maximum, rates of reproduction per animal.

P9.4 Breeding rates, litter and clutch sizes, and population age structures are widely used as measures of population reproductive success and as one basis for decisions in wildlife management.

P10.1 Infraspecific competition is mediated by either hierarchism or territorialism in many wildlife species. Subordinate or nonterritorial animals tend to have lower rates of reproduction and higher rates of mortality.

P10.2 Stresses resulting from any environmental factors that are other than optimum and from infraspecific competition are cumulative and cause a set of

physiological responses known as the general adaptation syndrome (GAS). The role of the GAS in wild populations is not well understood since its effects will be confounded with similar direct effects of environmental inadequacy. However, the GAS occurs with reduced reproduction and increased mortality rates in laboratory populations and probably also in wild populations.

P10.3 Levels of intraspecific competition and stress are positively correlated with population ecological density. Their negative impacts on rates of reproduction and mortality form an intrinsic mechanism of population regulation in response to varying ecological density. The importance of these behavioral and physiological mechanisms in regulating population size varies greatly among species.

P10.4 Since animal behaviour and physiological respond to changes in ecological density, wildlife biologists can measure trends in behavioural and/or physiological parameters as indicators of trends in

ecological density.

P11.1 Wildlife mortality is abundant, equaling reproduction in the long run. Most wildlife mortality is normal, being of types and rates to which wildlife species are adapted. However, some mortality is abnormal, being of types and rates that have not been common during the species, evolutionary histories. Excessive levels of normal types of mortality are usually symptoms of habitat deficiencies that expose or debilitate animals. However, abnormal mortality may drastically reduce wildlife populations, even in habitats providing all the needed resources of the species.

P11.2 The major types of wildlife mortality are starvation and malnutrition, harvest, accident, predation, exposure, and disease. The ultimate causes of wildlife mortality are often combinations of these types.

P11.3 Mortality rates may be directly or, more rarely, inversely related to population ecological density,

or they may be independent of density. Direct ecological-density dependent mortality results in regulation of a population by the quantity and quality of available habitat resources. In compensatory mortality, the magnitude of several types of mortality may vary while total mortality remains constant. This is most common in species with high iotic potentials and with behavioural mechanisms that subordinate "excess" animals to conditionsnot favouring survival.

P11.4 Starvation and malnutrition are usually associated with increased susceptibility to disease and predation.

P11.5 Harvest is usually a regulated form of mortality. A variety of regulations can be used to control harvest pressure and success so that various biological and sociological objectives might be achieved. Harvestable surpluses can be removed from many populations without affecting the sizes of these populations at subsequent periods. Replacive (compensatory) harvest substitutes for natural

mortality and does not affect population size at the next breeding season. Harvest of small, upland game tends to be self-regulating in a density-dependent manner.

P11.6 Accidental death is not frequent in most wildlife populations, but the frequency of accidents may be increased when human alteration of the environment creates new hazards for wildlife.

P11.7 Predation has shaped the behaviour and morphology of prey species and continues to influence the distribution, abundance, and composition of populations. In the United States, attitudes toward predators have changed greatly as our understanding of the ecology and dynamics of predation has grown. It is now recognized that numerous interacting factors influence predator : prey ratios, prey vulnerabilities, and the functional responses of predators to prey availabilities. These factors vary among sites and periods. thus, the impacts of predation upon a prey population may be site and time specific. Selective predator control

may be an appropriate management tool in some situations where goals, cost-effectiveness of predator control, and local predator; prey dynamics have been considered. However, the complexity of predator-prey relationships dictates that the results of predator control programs should be continually reevaluated.

P11.8 Exposure is often a density-independent form of mortality and is usually most frequent near the peripheries of geographic ranges of species.

P11.9 Wildlife diseases may be nutritional, toxic, or infectious. Most toxic diseases are caused by chemicals from human activities. Infectious diseases may be normal or abnormal and persistent or epizootic in occurrence. Normal, persistent infections tend to cause disease problems when wildlife populations are at high ecological densities. Epizootics are less predictable, and most are not well understood. trends in weather and in genetic or acquired immunities of animals may account for epizootic outbreaks. Abnormal diseases, in which

hosts have not evolved with disease-causing toxins or parasites, result largely from man's activities. Normal, persistent infections can be controlled by maintaining populations at relatively low ecological densities Direct control of wildlife diseases is a relatively new management tool and involves hazards of circumventing natural selection and obtaining wildlife to require continued human assistance for disease control.

P12.1 For wilelife management purposes, it is useful to classify thenumerous and complexly interrelated factors operating in ecosystems as welfare factors, decimating factors and environmental influences.

P12.2 Welfare factors, the habitat requirements of wildlife species, can be defined at several levels of resoltion. At the lowest level of resolution, (1) all species require oxygen foods, cover types, special needs, interspersion, and space. With increasingly greater resolution, the habitat requirements of a species can be defined, (2) empirically as a list of needed habitat types, (3) as a list of specific welfare

factors, and (4) as a list of welfare-factor components. Suitable habitat must supply welfare factors for both sexes and all age classes of animals during all seasons and weather conditions.

P12.3 A lack of welfare factors may limit the growth and/ or performance of a population. The presence of decimating factors may depress a population to levels below that which welfare factors could support. However, since welfare factors usually can alleviate the effects of decimating factors, welfare factors exert the most fundamental influence upon wildlife abundance and performance.

P12.4 Each wildlife specis has several welfare factor requirements. It is unlikely that a given 'habitat will supply all these welfare factors in perfect balance to a populaion's needs at a given time. Therefore, it is likely that a small number of welfare factors, perhaps only one, will limit a population at a given time and place. Other welfare factors would be nonlimiting. However, the availailities of welfare factors vary continuously over time and space.

Often different sets of welfare factors will be limiting in different areas and in different seasons and years. When the number of limiting welfare factors is relatively large, it will be more difficult to detect which factors are limiting and which are nonlimiting.

P12.5 Detecting limiting welfare factors is basic to efficient programs of habitat management. Two methods for detecting limiting factors are (1) observing correlations between trends of welfare factors and trends in population performance, and (2) observing symptoms of welfare-factor deficienceis in the animals and symptoms of welfare-factor overuse in the habitat.

P13.1 Wildlife habitats are not stable. Much changes occurring in habitats due to biotic succession, retrogression, or to rather sudden natural or man-caused disturbance such as by fire, logging, or flooding. These changes alter food, cover and other habitat resources for all wildlife species and are fairly predictable. Much wildlife habitat

management is, therefore, the management of succession, retrogression, and disturbance.

P13.2 The rate and direction of biotic succession on a site and, therefore, the nature of impacts on wildlife depend on many environmental factors. These factors include (1) those related to the type and intensity of recent disturbance, (2) those determining the availabilities of plant reproductive materials, and (3) those influencing the availabilities of plant growth. These factors usually vary among sites. Therefore, predicting the results of disturbance and subsequent succession and their effects on wildlife depends on knowing the impacts of these factors on local areas. These factors also vary within sites. As a result, secondary successions following disturbances usually produce a mosaic of successional stages that provide a diversity of wildlife habitat resources.

P13.3 Although succession proceeds toward a climatic climax association of species that is relatively stable, succession may be arrested by local

conditions including persistent or frequent impacts of natural or man-caused populations of wildlife. Relatively stable communities that are determined by impacts of natural populations of wildlife are termed zootic disclimax communities.

P13.4 Wildlife species are broadly classified into three categories describing their relationships to ecological succession. Class I species are adapted to climax communities; maintaining their habitats requires protection from disturbance or retrogression. Class II species are adapted to developmental commuities, and frequent disturbance is necessary to maintain their habitats. Class III species require a mix of successional stages; maintaining or improving the habitat of a Class III species may require protection or disturbance, depending on which successional stage is most limiting to local abundance.

P13.5 Wildlife diversity increases during primary biotic succession and is greatest in the climax community or in a stage of succession near climax. However,

since a mosaic of successional stages usually develops during secondary succession, wildlife diversity on a disturbed area is expected to peak before all of the area reaches climax conditions.

P13.6 Forages produced on recently disturbed areas tend to be of higher quality than forages in old-growth stands of vegetation. The diversity and quality of food and cover on recently disturbed areas has often been observed to produce an abundance of Class II and Class III wildlife, and many of these animals have been game species. Disturbance, for example, caused by logging or prescribed fire, has been recognized as an economical method for enhancing game populations over large area. However, although disturbance is expected to benefit Class II species, it will be harmful to Class I species and could be harmful to Class III species.

P13.7 At high ecological densities, herbivores can have retrogressive effects on forage resources. Measurement of forage condition and trend is one method for assessing ecological density of a

herbivore population.

P14.1 Weather affects wildlife directly as a cause of mortality and indirectly by restricting animal movements and influencing the abundance and availabilities of habitat resources and the abundance of competitors, predators, and disease organisms. Much direct effect of weather on wildlife results in mortality of young animals. Both direct and indirect effects are oftenmost severe at the peripheriesof species geographic ranges. These largely unpredictable impacts on wildlife abundance and productivity are responsible for much uncertainty in wildlife management.

P14.2 The direct and indirect effects of weather on wildlife are often as great or greater than those of any other environmental influence, including the effects of management. Therefore, it is often necessary to determine and measure the effects due to weather before the effects of other influences, including management, can be detected.

P14.3 Present and past climatic patterns largely determine the distributions of wildlife species. Transplants of species have the greatest chances of success when animals are moved between areas with similar, rather than dissimilar, climates. Isolated, local populations often persist within areas of in hospitable climate as relicts from past climatic regimes. These relict populations have great scientific and educational values.

P15.1 The sigmoid or logistic model is the most widely accepted and used principle of wildlife population dynamics. The model predicts changes in population productivity, rates of reproduction and mortality, population quality, and habitat condition that occur as a population grows toward a stable carrying capacity. However, the model's assumption of a stable carrying capacity is unrealistic. Therefore, an adaptation of the model in which population process are determined by ecological density, rather than by density of the population, is necessary for using the model in analyzing

populations and in predicting impacts of changes in population or habitat parameters.

P15.2 The sigmoid model demonstrates that wildlife populations, as other organic resources, can be managed on a sustained-yield basis. When a population is habitat limited and environmental resistance is ecological density dependent, as in the adaptation of the sigmoid model, maximum harvestable surpluses are produced by maintaining the population at an intermediate level of ecological density. This level of population size is below the maximum, sustainable population. At this level, animal quality and habitat conditions are at intermediate, rather than maximum attainable, levels.

P15.3 Species with high biotic potentials have high rates of population turnover. Harvestable surpluses for these populations tend to be determined, not by the number of breeders at the start of each breeding season, but by rates of reproduction and survival of juveniles during the season immediately

preceding harvest. Species with low biotic potentials exhibit low rates of population turnover. The numbers of breeders present at the startof each breeding season are more important in determining harvestable surpluses for these species.

P15.4 The stability of wildlife population is supported by (1)existence in a relatively stable environment, (2) any intrinsic mechanisms of population control, (3) a low biotic potential and high longevity of animals, (4)existence in a diverse environment, which generates precise ecological density dependent reproduction and mortality, and (5) a lack of time lags in density dependence. Time lags in density dependence are due to population and environmental characteristics that respond slowly to changes in ecological density. Such persisting population characteristics are population age structure, the physical and physiologcial conditions of animals, and the genetic constitution of the population. Persisting environmental characteristics are habitat conditions and the prevalence of

predators and disease organisms.

P16.1 Ecological carrying capacity is a variable habitat characteristic determined by the changeful amounts of welfare factors that limit the size and productivity of a species population. Economic carrying capacity is defined by management goals for population productivity, animal quality, and habitat conditions but is determined by a habitat's variable and limited ability to sustain achievement of these goals. Combining these concepts, carrying capacity is the number of animals of a specified quality that a habitat can support while sustaining a specified, but not progressively increasing, level of impact on habitat resources.

P16.2 Any combination of limiting welfare factors may determine a carrying capacity for a species population. Ecological carrying capacities determined by limiting amounts of forage, of escape cover and interspersion, and and space are termed subsistence density, security density, and tolerance density, respectively. Economic carrying capacities

defined by management goals for population productivity and for population control are termed maximum-harvest density and minimum-impact density, respectively.

P16.3 Since both population size and ecological carrying capacity are variables, populations are often either above or below the carrying capacities of their habitats, and populations fluctuate over a continum of ecological densities. In the long-run, however, population sizes tend to follow trends in ecological carrying capacities because animal quality, rates of reproduction and survival, and habitat condition tend to be ecological-density dependent. When a population is maintained below ecological carrying capacity to maximize harvestable surplus, a precise achievement of this economic goal will depend on understandig the relationship of the population and habitat to variation in population size and variation in carrying capacity of the habitat. Local data will be needed to achieve this understanding.

P17.1 Long-term trends in abundance of wildlife

populations exhibit five patterns; stable, unstable, eruptive, cyclic, and regionwide synchronous.

P17.2 Cyclic populations exhibit regularity of long-term trends in abundance, and reasonably accurate predictions of population trends can, therefore, be made. A_2 to 4 year cycle is common in small rodent; a 10-year cycle occurs in populations of hares, grouse, and other northern species in America. Causes of the 1-year cycle are not well understood. Geographic and interspecies synchrony have been two characteristics of the 10-year cycle most difficult to explain.

P17.3 Pheasants and some lagomorphs, at least, have exhibited regionwide synchrony in population abundance but have not demonstrated regularity in these trends. causes of synchronous trends in these populations are not well understood.

P17.4 Without several long-term studies of local population, we are unlikely to understand the mechanisms of cyclic and regionwide-cynchronous populations.

P18.1 Selecting a data basis for a management programme is one of the management biologist's most important decisions. Slection will be influenced by the availability and precision of methods for measuring population and habitat characteristics and by budget constraints; but the selected data base should have a meaningful relation to management objectives.

P18.2 The types of wildlife measurements are (1) population indices, (2) population censuses, (3) habitat measurements.

P19.1 Wildlife management is the art of making land produce valuable populations of wildlife, often in conjunction with other forms of land use. In the United States, wildlife is usually managed according to the desires of a diversity of public interests; but management goals should be carefully defined and frequently reviewed.

P19.2 Management of species populations is based on knowledge of the life histories and habitats of

species This knowledge is found in a growing and evolving literature of scientific publications.

P19.3 In intensive management, limitations of knowledge and budget are comparatively small; a comprehensive understanding of populations, habitats, and public desires for wildlife values can be attained; responses of populations, of habitats, and of the public to management practices can be predicted with comparative accuracy; and a linear process of management may be appropriate. However, most wildlife management is extensive, with comparatively large limitations of knowledge and budget. In these cases, understanding and predictions concerning populations, habitats, and public desires are limited and perhaps inaccurate. Consequently, a more cautious cyclic-incremental process of management is usually appropriate. The key to practicing cyclic incrementalism is in planning to measure responses of populations, habitats, and the public to management practices. Cyclic-incremental management is dynamic, capable

of responding to changing habitat and population conditions, the vagaries of public desires, and the development of new knowledge applicable to the management situation.

WILD LIFE MANAGEMENT IN INDIA:

The idea of preservation of wildlife is not new to India. It is the integral part of Indian culture. The vedas contain hymns in praise of animals. Kautilya's Artha Shastra provides several penalties for killing, entrapping or molesting deer, bison, birds and fish in protected areas. In third B.C. Ashoka mentioned about the protection law of game fishes. during medival period, Mughal emperors showed deep interest in protecting animal life of the country. Game was protected and preserved in hunting resources called' Sikar Guha." This trend continued for Ist 100 years (with accelerated pace) of British rule (up to 1840). There was a mad destruction of animals during this period. As a result many animals specially lions, tigers and cheetahs were almost wiped out.

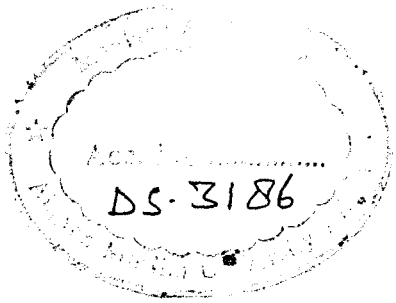
In Assam Colonel pullock, a military engineer shot a Rhion or a Buffalo for every breakfast almost everyday. A

former Raja of a state in Madhya Pradesh, probably killed highest number of tigers (i.e. 1170) in the World. During this period, more wildlife was killed than through centuries of hunting Animals such as nilgiri black buck,four horned antelope, Indian gazzle, single horned Rhinoceros and many species of birds were near extinction. India was probably the Ist country to enact a wildlife protection act. The wild birds and animals protection act was passed in 1887 and was repeated in 1912. The forest act XVI of 1927 deals with game protection in the states. Various states have established their own wildlife protection laws. In 1952 Indian Board for wildlife (IBWL) was established. This followed setting up of Wildlife Boards in individual states. Separate wildlife preservation or organization sere also created in same states (Wildlife circle). In 1972, new wildlife protection act was passed. Under this act possession, trapping, shooting of wildlife alive or dead, serving their meat and are watched by special staff, the Chief wildlife Warden and other authorised forest officers.

In Assam, Colonel Pullock, a military engineer shot a Rhion or a Buffalo for every breakfast almost everyday.

A former Raja of a State in Madhya Pradesh, probably killed highest number of tigers (i.e. 1170) in the world. During this period, more wildlife was killed than through centureis of hunting. Animals such as nilgiri black buck, four horned anteelope, Indian gazzle, single horned Rhinoceros and many species of birds were near extinction. India was probably the 1st century to enact a wildlife protection act. The wild birds and animals protection act was passed in 1887 and was repeated in 1912. The forest act XVI of 1927 deals with game protection in the states. Various states have established their own wildlife protection laws. In 1952, Indian Board for Wildlife Boards in individual states. Separate wildlife preservation or organization were also created in same states (Wildlife circle). In 1972, newwildlife protection act was passed. Under this act possession, trapping, shooting of wildlife alive or dead, serving their meat and are watched by special staff, the Chief Wildlife Warden and other authorised forest officers. Under the wildlife (Protction) Act, 1972 the state government are empowered to declare any area as a Sanctuaryor a National Parks for the purpose of protecting, propagating or developing wildlife or its environment. In

India there are 19 National Parks comprising an area of about 6471.22 sq. k. The total area under sanctuaries and National Parks comprises 19% of the reserved forest area of the country and 2.3 percent of the total geographical area. An export committee has recommended that about 4% of the total geographical area should be brought under National Parks and Sanctuaries.



INTRODUCTION REFERENCES

1. CONCEPT IN WILDLIFE MANAGEMENT

   BY B.B.HOSETTI

2. FUNDAMENTALS IN WILDLIFE MANAGEMENT

   BY RAJESH GOPAL

3. PRINCIPLES OF WILDLIFE MANAGEMENT

   BY JAMES A. BAILEY

4. AN INTRODUCTION TO WILDLIFE MANAGEMENT

   BY S.S. NEGI AND V.K. BAHUGUNA

5. WILDLIFE IN INDIA ITS CONSERVATION AND CONTROL

   BY P.D. STRACEY

6. WILDLIFE MANAGEMENT

   BY ROBERT H. GILES

PART -2
BIBLIOGRAPHY

WILDLIFE MANAGEMENT GENERAL

WILDLIFE MANAGEMENT, AFFORESTATION WORKS ASSSSMENT

1. PAUL RAJ (S). Assessment of value additios in afforestation works. The Indian Forester. 124, 9; 1990, Sep; 679-86.

The article shows the forest department so far no qualified analytical method to evaluate afforestation works is available. This is the first attempt to evaluate the afforestation works by identifying all the values obtained. The relative importance of each value is disussed with reference to particular afforestation works. This will help to understand which value should be given priority in any afforestation works according to the object of management. The methodology will pave way to further thinking on this issue so as to bring out still refined methods.

-, AGRPFORESTRY SYSTEM

2. RAWAT (Laxmi). Climatology for agro-forestry systems. The Indian Forester. 123, 7; 1997, July; 664-70.

The article reveals that in agriculture and

forestry, climatic information has much importance as in other fields. From the time the seeds one sown untill plants and harvested and stored, crops more or less dependent, on weather, particularly during certain critical periods in this growth. The appropriate practice of agro-forestry depends upon combination of climate and other factors. The systematic intercropping of trees and strups with agriculture crops changes microclimatic conditions, which have reciprocal consequences on productivity. Shelter belts and muckhymodify a number of meterological variables, there, by increasing yield of the crop. A number of studies highlighting these influences of shelterbelts and muckhes on microclimate and yield are reported in the article.

-, ARAVALLI PROJECT, STRATEGY

3. VARMA (V.K.) and SRIVASTAVA (J.P.I). Strategy for awareness creation among rural masses in the Aravalli project : An evaluation. The Indian Forester. 123, 6; 1997, June; 499-502.

The article describes the success of an area rehabilitation project, particularly when common

lands are involved, largely depends upon eliciting cooperation of the local communities in providing effective protection to the treated area. A strategy for awareness creation among village communities, members of village Forest Committees / Panchayat Project staff and school children was, therefore designed and implemented with particular emphasis on women's involvement. An evolution of the strategy was undertaken by a survey. The survey revealed that (i) a majority of the villagers had participated in the extension programmes, (ii) they were aware of the project - interventions and concomitant flow of benefits. (iii) a substantial proportion of the sampled population cooperated in protecting the plantations and were even been to raise seedlings for the project, besides participating directly in the project activities.

-, CHANAKA-DAMPARA, WILDLIFE SANCTUARY

4. SINGH (K.R.). Participatory approach to relocate villages from protected area: A lesson from Chanaka-Dampara wildlife sanctuary. The Indian Forester. 123, 6; 1997, June; 356-64.

The article shows that rehabilitation of villagers

from prtoected area is one of major problems of forest the wildlife manager in India. The present case study involving relocation of a part of village from Chandala-Dmpara wildlife sanctuary near Bhubaneswar, based on participatory approach in one of the success stories which throws lights on the possible methodology for relocating villagers from protected area by developing a sense of mutual trust and understanding. The method can be applied also for any community problem, rehabilitation proposal arising due to irrigation, mining, industrial or other project and even for community development.

-, CHIMMONY WILDLIFE SANCTUARY, REMOTE SENSING DATA

5. SURAJ (M.A.), MENON (A.R.R), VARGHESE (A.O), SURESH BABU (P.K) and PRADEEP KUMAR (M). Land cover mapping using remote sensing data : A case study for Chimmony wildlife sanctuary. The Indian Forester. 123, 1; 1997, Jan; 53-60.

The article describes that land maps depicting various vegetation cover classes are highly necessary for sanctuary management. Remote sensing data

utilization for cover type mapping is one of the most cost effective method for vegetation mapping especially in tropis. Here an attempt is made to map the forest vegetation of chimmony wildlife sanctuary using aerial photography(black and white, 1:15,000) and land sat TM FCC (1:50,000 using the standard visual interpretation techniques.

-, DEFORSTATION SOLUTION, LOCAL COMMUNITIES, role of ANDHRA PRADESH

6. MUKHERJEE (S.D.). Is handling over forests to local communities : Solution to deforestation - Experience in Andhra Pradesh (India). The Indian Forester. 123, 6; 1997, June; 460-71.

The article reveal that the deforestation can not be stopped without the joint efforts of community and forest department. The experiences has also shown communities of their own can not do much. It is the combined effort of community and government, that seems to be the best solution under the prevailing circumstances. Similarly, participation of the people absolutely necessary to keep constant vigil against all who indulge in the degradation of

forests. Therefore, the people should be motivate and involved for the better management of the forests. The success of joint forest management in Andhra Pradesh has been described.

-, DESERTIFICATION, GUJARAT, SAURASHTRA REGION, case study

7. PANDEY (A.N.), PARMAR (T.D.) and TANA (S.R.). Desertification : A case study from Saurashtra region of Gujarat State of India. Tropical Ecology. 40, 2; 1999, Winter; 213-20.

The article describes the sequential changes in soil properties along forest, grassland, degraded land and desert ecosystems with different vulnerabilities to degradation, were assessed to understand the process for the development of desert like landscapes in semi-arid zone of Saurashtra region of Gujarat state of India. The concentration of fine soil particles (clay and silt) decreased whereas, it increased for sand particles with the deterioration of ecosystem. Bulk density was maximum at degraded land ecosystem and consequently pore space was minimum water holding and field capacity of soil decreased with the

degradation of ecosystem and exhibited a positive correlation with the clay content of soil. Eventually, desertification causes progressive drier condition of soil. The concentation of organic carbon, total nitrogen and available phosphorous significantly decreased whereas, concentration of calcium, magnisium, potassium and sodium significantly increased with deterioration of ecosystem. The concentration of zinc and manganese increased whereas, it decreased for iron with the degradation of ecosystem. Electrical conductivity and pH of soil increased suggesting that soil salinity develop with desertification.

-, DEVELOPMENT PROGRAMME, INSTITUTIONLISATION, SOCIAL, INDICATIONS

8. ROY (S.B.). Social indications towards institutionalisation of development programme : A case study from joint forest management. The Indian Forester. 123, 6; 1997, Jun; 519-26.

The article describes that the department of forests government of India, has introduced compulsory training for Indian Forest Service Officers

on joint forest management, participatory rural appriasal and gender issues. Refresher courses are also offered, with participants from the rank of Divisional Forest Officers to chief conservation of forests attending. So the quantitative information collected for the success of joint forest management has been described in detail.

-,-, VILLAGE FOREST COMMITTEE BILASPUR

9. UPADHYAYA (J.K.). Village resource development programme of village forest committees in Bilaspur forest circle, Madhya Pradesh : A case study. The Indian Forester. 123, 6; 1997, June; 484-93.

The article gives that the dependence of landless and poor masses of the villages in the vicinity of forest for their livelihood, is a well known fact. An integrated approach for the eco-development of this target group is helping to reduce their dependence on the forest. Other groups are also being beneficial by eco-development programmes and their active cooperation is being sought for joint forest management.

-, DEVELOPMENT PROJECT, INTEGRATED WASTELAND, JAIPUR, EVALUATION

10. SHARMA (H.K.). Evaluation of an integrated wasteland development project in Jaipur district (Rajasthan). The Indian Forester. 123, 12; 1997, Dec; 1139-48.

The article reveals that Rajasthan is the second largest in area, 3/5th of its area lying on the west of Ararvalli hills is covered by shifting sands and sand dunes known as their desert. Forest area is about 9% of its geographical area. State has about 25% area as available wasteland. Therefore, there is vast scope for development of forestry and past are development. Government of India, Department of Wasteland Development sanctioned as integrated wasteland development project in Bandi Basin in Jaipur district. 2939 ha of wasteland was tackled in 1994 and 1995 under various models of treatment this work has been evaluated by the author out of the area evaluated, about 78% area planted was found to be good to vary good.

-, D.F.O. role of

11. DAS (S). Growing beyond the D.F.O. The Indian Forester. 123, 11; 1997, Nov; 1017-26.

The article shows the entire discussion in one sentence. It is essential that IFS officers must grow beyond the DFO for the most optimal and efficient management of the forest resources. The article discusses alone management of forest administration at three levels, e.g.(i) policy making, (ii) supervisory level, (iii) executive level and role of the D.F.O. for the most optimal and efficient management of forest resources.

-, ENVIRONMENT, PROBLEMS & PERSPECTIVE

12. SHARMA (Manju). Current environmental prolems and future perspectives. Tropical Ecology. 37, 1; 1996, Summer; 15-20.

The article discusses the major issues requiring both global and national attention are conservation of biodiversity, and protection and conservation of fragile and critical ecosystems. Extensive and intensive research efforts are called for an

interdisciplinary basis. Large sale demonstrations and fields trails of the new technology packages, specially from the view point of validation of research result would be essential. A developmental balance in harmony with environment consisting of awareness building, scientific measures, decentralized approach and inclusion of environmental safeguards has been briefly mentioned. It is concluded that there is stupendous task before the scientific development community to take up research and development on all aspects of environmentally sustainable strategies.

-, EVALUATION

13. SINGH (H.S.). Evaluation criteria for determining priorities for wildlife conservation. The Indian Forester. 123, 10; 1997, Oct; 879-86.

The article reveals that an attempt has been made to evolve a new methodology, tested for all wildlife protected areas in Gujarat. The method prescribed is subject to modification after deliberating various issues. Maximum weightage is alloted to biologicaland ecological features which decide the conservation value of the areas. Protected areas with

low ranking can have high conservation value if it fulfills the specific objective of the conservation.

-, FOREST DEVELOPMENT CORPORATIONS, EVALUATION

14. SHARMA (R.A.). Evaluation of the forest development corporations of India. The Indian Forester. 124, 3; 1998, Mar; 211-19.

The article decribes that the origin of forest development corporation (FDCs) in India is traced and their functioning evaluated within their stated objectives by taking a case study of the Orissa Forest Development Corporation. The dualism in their functioning, crept in due to a FDC being accompany with commercial objectives, and simultaneously a government organisation burdened with socio-economic objectives has been brought out. It is argued that all the people-oriented programmes should be implemented by the State Forest Departments and the role of FDCs should be limited to commercial ventures by incorporating business management principles required for increasing productivity accountability and cost effectiveness.

-, FOREST FIRE CONTROL, PEOPLES PARTICIPATION

15. NETALKAR (Prakash S). Peoples participation in forest fire control. The Indian Forester. 125, 5; 1999, May; 452-54.

The article describes the preservation and conservation of forests and control of forest management and its success is described in detail. This is a good method of this fire protection and should be done in all the villages of the division repeatedly for better results in fine protection. At the end of the season, VFCs doing good work can be awarded for their efforts in preserving and protecting their forests.

-, FOREST MANAGEMENT, fifty years of

16. SHAH (S.A.). Fifty years of forest management in India. The Indian Forester. 124, 6; 1998, Jun; 381-90.

The article describes forest management during the 50 years of independence has made a full circle: from conversion to uniform crops and back to conversion to irregular crops. The early years of

independence were characterised production (for industry) euphoria. Von Mon Roy's Report on the status of raw material supply in the country and national commission on Agriculture's Report reinforced this industry oriented production. The objective of sustained yield of timber which guided and governed forest management during the early 30 years of independence, could not be achieved. The world conservation strategy attended the way we look at forest and forests management. During subsequent years, environmental awareness and consciousness swept the world. The earth summit, the convention on Biological Diversity and the recent climate change convention have all focussed on the need to maintain forest cover, conserve biodivesity and ensure sustainability. The restoration of these forests requires a different approach; a different technology and a different administration structure. There is one of the biggest challenges facing the forests today.

-, FORESTRY, ACHIEVEMENTS, TRIPURA, fifty years of

17. RAY (P.N.). Fifty years of forestry in Tripura achievements in retrospect, macrofuturistic perspectives and imperatives. The Indian Forester. 124, 6; 1998, Jun; 397-412.

The article deals with achievements during last 50 years of forestry in Tripura have been documented, highlighted notable developments, in forest resources base, afforestaiton, infrastructure, control of shifting cultivation, conservation efforts, are being mechanisms, capacity building and institutional strengthening. A critical appreciation reveals that gains accrued but disappointments were also many. It evaluates the efficacies of implementation of National Forest Policies, management planning process conservation, socioforestry, commercial function, protection, regulation and enforcement works pointing out the issues where forestry organization could not achieve certain cherished goals and why; several institutionalised shortcomings, external constrains

and organizational weaknesses are identified. The imperatives of a mission driven forest management in the state facing the emerging challenges, have been suggested.

-, FORESTRY, ANDAMAN, FEATURES

18. CHAUDHRY (Pradeep). Striking features of Andaman forestry. The Indian Forester. 124, 6; 1998, Jun; 463-72.

The article deals with certain features of timber harvesting operations in Andman group of islands and its related conserquences on fragile ecosystem of these islands. An integrated approach involving improvement in land use pattern, cattle management, local people industry administration interface has been stressed upon.

-, FORESTRY LITERATURE, CLASSIFICATION

19. RAY (M). Classification of forestry literature. The Indian Forester. 125, 5; 1999, May; 503-07.

The paper discussed about classification of forestry literature has been a thought-provoking topic of research that has been dealing scientifically by foresters throughout the world as early as in 1903.

Several classification schemes have been designed from time to time viz. the Harvard System in 1926 (India), Flury System (1933), the Commonwealth (IUFRO) and Food & Agriculture Organization (FAO) of the United Nations have been instrumental in releasing their versions as the Oxford Decimal Classification (ODC) and Froest Decimal Classification (FDC) in 1954 and 1990 respectively. ODC is very elaborate and is perfectly suited for a manual filing and indexing system. This has been revised as the FDC keeping in mind the application of computers in the field information storage and retrieval system.

-, FORESTRY, GAINS, and LOSSES, POST INDEPENDENT

20. CHATURVEDI (A.N.) Fifty years of forestry in independent India : Gains and Losses. The Indian Forester. 124, 6; 1998, Jun; 391-96.

The article describes the past, present and future scenario of forest management in India. The status of major forestry, social forestry, joint forest management, foresting research, forest education,

forest based industries have been discussed.

-,-, POST INDEPENDENCE, fifty years of

21. RAWAT (G.S). 50 years of forests and forestry in India after independence. The Indian Forester. 124, 6; 1998, Jun; 367-80.

This article is an overview of the path of progress of Indian forestry over the last time decades of post-independence era. The State of India's forests and Indian forestry at the time of independence is described. Various milestone events over this period are enumerated. The changing trends in forestry thought and practice, evolving legislation, institutions, and the evolving concepts have been detailed. India has been fortunate in having a forestry department established on scientific lines since nearly a century. The period since independence has accelerated the process of scientific management of forest, despite the constraints faced by way of exploding population and alternate land use practices which have impacted upon the forests in a big way. The foundation have been well-laid. It now remains to the nation and to the foresters to carry the new

concepts and thinking foreward to preserve and protect the national forest and biodiversity.

-, GABIAN STRUCTURE

22. JAIN (Vivek). Gabian structures: A boon in protected area management. Wildlife Institute of India Newsletter. 5, 4; 1998, Oct-Dec; 19-22.

The article discusses the Gabian structure can be taken up as an easy method to solve day to day problems of habitat management The need is to start the use of these structures. Once the field staff finds it useful, they themselves shall come out with many more useful solutions to field problems with the help of Gabian structure.

-, GRAY LITERATURE

23. DEORANI (S.C). and DABRAL (S.L). Forestry gray literature in India and its management. The Indian Forester. 123, 7; 1997, Jul; 607-14.

The article reveals that informed forestry literature in India has been collected for over a century. The Indian Council of Forestry Research and Education (ICFRE) around 2.6 lakhs of documents, classified into 3,600 fiels as per DDC system of

classification. This paper highlights the importance of the documented forestry grey literature to research and its contribution in completing bibliographies of important forest free species. It has also been planned to preserve these involve documents as per archival norms and capture them digitally on computer storage media viz. hard disks, CD-ROM, etc. for instant use of the forestry research workers and professionals.

-, INFORMATION, SOURCE, INTERNET

24. SHARMA (Amrish K), DEORANI (S.C) and GUPTA (Pawan K). Souces of forestry information on the internet. The Indian Forester. 123, 12; 1997, Dec; 1109-16.

The article reveals that internet has revolutionised the computer and communications world like nothing before. The invention of the telegraphs, telephone, radio and computer set the stage for thin unprecedented integraiton of capabilities. The internet is at once a world-wide broad casting capability, a mechanism for information dissimination and a medium for

collaboration and interaction between individuals and their computers without any regard for geographic location. These database contains textual, graphical, sound and movies, multimedia information.

-, INFORMATION TECHNOLOGIES role of

25. DEORANI (S.C.) and RAY (Malabika). Electroic information products in forestry. The Indian Forester. 123, 1; 1997, Jan; 11-20.

The article deals with information technology is revolutionising the concept of record keeping and the digital media is overtaking the conventional print media. The role of computers in the systematic and scientific management of forestry research databases and information is significant. With the introduction of sophisticated information handling tools in the forestry sector concepts, actual research findings are being rapidly converted into the electronic form so as to be stored, retrieved and utilised in accordance with the needs of individual forestry research workers. Some electronically stored information products available are briefly described in thin article.

-, JOINT FOREST MANAGEMENT

26. PANDEY (Gopa). Joint Forest Management : Perceptions of new incumbents in Indian forest service. The Indian Forester. 123, 6; 1997, Jun; 527-35.

The paper describes the training pattern of IFS officers recruited by the UPSC is frequently moderated to address the emerging professional needs. Professional training of Indian Forest Service Officers at Indira Gandhi National Forest Academy at Dehradun has also been tailored to suit the upcoming socioeconomic dimensions of forestry profession in India. A survey of IFS probationers from four batches of Indian forest service officers including the first batch which has undergone the latest pattern of on the job training sandwiches between profession and advance phases has been conducted to interpret their assumptions and perceptions on the issue of joint forest management in India. Though their exposure to the process involving limited, yet the new generation has expressed same key issues from its objectivity to the

problem which needs to be address. Most of them have revealed optimistic thoughts about the process and accept JFM as one of the option of regulating forestry in India.

-,-, ANDHRA PRADESH

27. MUKHERJI (S.D). Up-date on joint forest management proramme in Andhra Pradesh. The Indian Forester. 124, 6 1998, Jun; 413-24.

The article describes that the joint forest management programmes being implemented with full vigor and with the active involvement of village level vana Samanakshana Samithies (VSS) in Andhra Pradesh. It has now come to a stage where positive results can be seen. Some of the VSS formed in 1993 are to day in a psotion to harvest the first rotation crop after successfully protecting the forests and improving it. This programme will be sustained and the deraded forests of Andhra Pradesh would be regenerated giving maximum benefit to the local people.

-,-, FAILED, ARJUNI MOUZA, cause of

28. MUKHERJEE (Neela). Why joint forest management (JFM) failed to deliver? A case study of Arjuni Mouza, Midnapore (West Bengal), India. The Indian Forester. 123, 6; 1997, Jun; 546.

The article descries that why the local commuities of Arjuni Mouza, (smallest revenue sub-division in Midnapora District of West Bengal) failed to protect the local forest under the joint forest management (JFM) and reap its benefit in five-years time as per their agreement with forest department. The article analyses the issue from different prospective and arrives at approximate cause of failure which is related to the livelihood food insecurity of poor people, including the tribals in that dispressed area. So we can say in short the article discusses the issue from different prospective and arrives at approximate cause of failure of Joint Forest Management in Arjuni Mouza in Midnapore of West Bengal.

-,-, IMPLEMENTAITON

29. SHARMA (Jitendra). Joint Forest Management: Some fundamentals reviewed. The Indian Forester. 123, 6; 1997, June; 536-41.

The article describes that ecological and social objectives that could be achieved through implementation of JFM programmes. It also examines the livelihood of changing needs and responses of the local communities in different types of possible socio-economic scenarios in which participating forestry programmes will have to operates in future. Need for research in various important policy related areas for JFM programmes as well as areas of potential conflict are also highlighted.

-,-, ISSUES

30. BAHUGUNA (V.K). Joint Forest Management: Emerging issue. The Indian Forester. 123, 6; 1997, June; 472-76.

The article gives the information about joint forest management is being practiced in many states now and these experiments are throwing up may chalenging issues for decision for the policy makers,

foresters, administraters JFM activists and the planners. This paper also discuses the philosophy of JFM as complementary to scientific forest management practices and focusses on the emerging issues for joint collaborative action by all groups engaged in promoting people participation in natural resource management.

-,-, KULLU

31. GUPTA (S.C). Joint Forest Management heralds a novel approach in Kullu. The Indian Forester. 123, 6; 1997, June; 512-18.

The describes that the JFM was started in Kullu during September 1994. The staff took in initiative and the JFM support team through various participatory traiing workshops sensitised the field staff as well as local people to bring about an attidunal change. Nine VFDCs have been formed and six micre plans prepared during last time and half years. The JFM approach has been successful inspite of many apprehensions expressed in the beginning.

-,-, LEGAL PROVISIONS

32. GUPTA (H.S). Legal provisions for joint forest management. The Indian Forester. 123, 6; 1997, June; 572-75.

The article describes that the legal provisions in respect of guide lines for involvement of village communities and voluntary agencies in the regeneration of degraded forest lands been discussed and it is hoped that their legal basin of JFM will put the foresters on move sound footing in their endeavour to conserve and manage forests and wildlife with the ultimate aim of balanced growth of environment and national development.

-,-, NEGOTIATIONS

33. RASTOGI (Alind). Negotiations : A challenging task in joint forest management. The Indian Forester. 123, 6; 1997, June; 542-45.

The paper describes the negotiation skills with the foresters can play a positive role in shaping the institutionalization of joint forest management (JFM) in India. The real challenge lies in the pace of transformation of organizational mandate into the

institutionalized process of participating management. The present day ecological conflicts have their root in economic compulsions, sociological stresses, technological intensification, challenging consumption pattenrs, scarce land availability and contending resource users. Making trade offs between competing goals is thus a necessary skill for the national resource managers. the paper also discusses the quantity, quality and pace of negotiations in the process of JFM.

-,-, PROJECT, FINANCIAL VIABILITY

34. HAQUE (M.S), KANNAPIRAN (S) and PAUL (A.M). Financial viability and bankability of JFM projects in India. The Indian Forester. 124, 6; 1998, June; 487-94.

The paper describes the possibilities of funding JFM projects by commercial banks. The author opine that to develop India's vast stretch of degraded forest lands of JFM approach is hence to stay. Since neither the centre nor the states have enough financial resources for their rejuvenation theme is a strong possibility of the involvement of commercial banks

to finance such projects is near future. Although all JFM projects may not be bankable, case studies suggest that JFM projects where teak and sal and bamboo are predominant species, there is a strong livehood of such projects beig bankable. It is also presumed that for sustenance of JFM on long term basis continuity of credit will play a major role in future management and protection of our forests.

-,-, role of

35. GUPTA (H.S). Note of joint forest management. The Indian Forester. 123, 6; 1997, June; 565-67.

The paper shows the management of forests in appropriate and judicious manner through joint forest management has been disussed in this paper. 554.66 acres is not a small area. If given due protection, in a few years it will bloom into natural forests. To plant such area, at present rate, it will cost around Rs. 22 lakh to the state exchequer. Hence, it is felt that JFM in a very important strategy for the modern forest management. It can help imensely if practiced in an appropriate and judicious manner.

-,-, WOMENS, PERSPECTIVE

36. DEY (Gautam). Participation in joint forest management from women's perspective. The Indian Forester. 123, 6; 1997, June; 694-98.

The article reveals that the women can play a dominant role in the implementation of joint forest management strategies because of their intimate association with forest. They depend on forest for various livelihood security services. They must get equal representation in the village forest council's and have a choice in the decision making viz. in the selection of species and other silvicultural measures for upgrading the degraded forests negative cover and biodiversity. Various women groups can be constituted to establish alternate income generation activities to ameliorate the living conditions of poor and distitute women dependent entirely on forest for their sustainenance.

-, KERALA

37. NAIR (K Sasidharan) and NAGESH PRABHU. Forestry in Kerala : yesterday, today and tomorrow. The Indian Forester. 124, 6; 1998, June; 425-32.

The article reveals that Kerala is one of the

most prosperous states of India. Its national forests are very rich in biodiversity. It is the only state in India where the forestry sector is getting so much support from homo stead forestry in meeting the timber and fuel wood requirement of the state, leading to sustainable management of biodiversity rich natural forests.

-, LARGE SCALE, REMOTELY SENSED DATA, EWPOTRANS PIVATION

38. JHA (C.S), GHARAI (B), MURTHY (M.S.K) and DUTT (C.B.S). Estimation of ewpotrans privation (e^+) at large scales using remotely sensed data. Tropical Ecology. 37, 1; 1996, Summer; 93-100.

This paper shows that the vegetated surface plays a very important role in regulating the atmospheric process and influencing climate change. Any alteration in the terrestrial ecosystem feeds back to further atmospheric and climatic change. One such role played by vegetation is in regulating the biospheric aspects of hydrological cycle through ground energy flux such as latent heat flux (e^+). Recent resources have shown that satellite remotely

sensed data is a key input for any large sale at estimation. This paper presents role of remote sensing.

-, MIZORAM

39. SAVANT (P.V) and PATNAIK (S.S). Forests and forestry in Mizoram : A profile. The Indian Forester. 124, 6; 1998, June; 433-39.

The article deals with Mizoram is primarily a Tribal state. Agriculture in the main stay of the people. Traditional 'Jhum' is practiced, the forests of the state broadly classified into (i) tropical wet evergreen, (ii) tropical semi-evergreen, and (iii) maintain sub-tropical pine forests. Past and present forest management system. After estation programme, farm forestry, wildlife management, biodiversity, conservation, forest research and training, joint forest management have been discussed.

-, MOIST FOREST, SOUTH INDIA

40. KUSHALAPA (Kodera A). Moist forests of south India. The Indian Forester. 124, 12; 1998, Dec; 985-95.

The article describes moist forests of south

India includes several forest types described by champion and seth in 1962. Many of them are climatic climax and a few are edaphie climax forest types. Due to heavy biotic pressure on these dwindling forests, the typical forest type described by them may not be available or seen in their pristine condition. The annual increase in human population is about 5% as against the national average of around 2.2%. The live stock population will reach about 5.00 million by 2000 AD. Forest fires, excessive grazing, uncontrolled removal of fuelwood and diversion of forest lands for non-forestry purpose are some of factors responsible for the degradation of forests. Increasing the present protcted areas, enrichment plantations, improved fodder development, intensive fire protection etc. are some of the measure needed by increasing the investments to atleast 5% of the total budget.

-, NATIONAL FOREST POLICY, 1998

41. JARNAIL SINGH. Evolving a holistic management strategy for forest resources. The Indian Forester. 124, 6; 1998, Jun; 473-86.

The article shows the National Forest Policy

1998 envisages a holistic and professional strategy for forest management for achieving the objectives enunciated there in. The traditional forest management approach (working plan) provides silvicultural treatment on sustained yield basis which is far inadequate considering the present scenario of resource conditions and policy objectives. The proposed strategy of forest management is based on holistic treatment of an ecosystem on watershed pattern. It stresses integral and site specific treatment of forest resources. The strategy incorporates overall planning for mine-unit the entire landscape of a district as well as site specific planning for micro unit. It provides modes to extend the forest cover to non-forest areas. It is an effort to provide natural management to the forest areas in their natural settings. Once the strategy assumes its natural form it will provide a lasting solution to the problem of management of forest resources for sustainable management.

-, PANCHAYAT LANDS, WESTERN HARYANA, 1982-92

42. RAWAT (J.K). Market value of growing stock on Panchayat land planted during 1982-92 in Western Haryana. The Indian Forester. 123, 7; 1997, Jul; 615-19.

The article describes that in 1993, a survey was carried out of the plantation raised on the Panchayat lands during 1982 to 1992 in the seven district of Haryana. The paper presents a methodology for estimating market value fo the plantation and consequently estimates the market value of tree crops growing on the panchayat lands. The paper also critically analyses the estimated values and gives certain recommendations for better management of these plantations.

-, PARTICIPATORY FOREST MANAGEMENT

43. JAIN (Shobhita). Certicicate in participatory forest management. Wildlife Institute of India Newsletter. 5 4; 1998, Oct-Dec; 28.

The paper reveals the Indira Gandhi National Open University has launched a certificat

eprogramme in participatory forest management of six month duration The IGNOU offers reasonably flexible duration for competing its programme. Duration of their certificate programme is flexible with a time frame of six months to two years. The certificate programme in participatory forest management consists of a total of 16 credits with four courses of 4 credits each that is, PFM 1: Forest Resources and use practices, PFM2: Foresters view of forest management, PFM3: Forest dwellers' perceptions and resources, PFM4: Implications of joint forest management. The eligibility of this certificate programme is 10+2 or its equivalent.

-, PEOPLE'S PARTICIPATION, GIR

44. SRIVASTAVA (Aseem). People's participation : A vital component in management of Gir protected area. The Indian Forester. 123, 6; 1997, Jun; 503-11.

The article discusses about the collaborative efforts of the people and the forest department have paid rich dividends in changing the scenario of Gir. But increasing th biotic pressure demands move to be done economically environmentally and in friendly

manner to preserve and protect the ecosystem.

-, PLANNING STRATEGIES, CHANGES, TAMIL NADU

45. DEY (Gautam) and MANOJ KUMAR SARCAR. Changes of planning strategies in forestry sector in Tamil Nadu. The Indian Forester. 124, 6; 1998, Jun; 440-48.

The article reveals that Tamil Nadu has fairly broad spectrum and 42 types of forests containing rich variety of flora and fauna are found in the state. The government of Tamil Nadu formulated and implemented many schemes for conservation, development and production in forestry sector. It has changed the planning process and planning strategies have shifted from more raising of plantations to that of a holistic approach of different five year plans have been highlighted.

-, RAINFALL PATTERNS, DOON VALLEY

46. RAWAT (Laxmi) and RAWAT (Vijay). Rain fall patterns in Doon valley, India. The Indian Forester. 123, 9; 1998 Sep; 714-24.

The article describes that the course of annual,

monthly and seasonal rainfall of New Forest has been discussed along with its variability, frequency, intensity over a period of 60 years (1931-1990). Annual rainfall at decadal intervals and 2 blocs of 30 years extremes of rainfall recorded, variability of rainfall monthly and seasonal, rainfall frequency monthly and seasonal rainfall, intensity - annual monthly and seasonal, temporal variation of frequency of rainy days have been analysed and discussed.

-, REMOTELY SENSED DATA WESTERN GHATS, ASSESSMENT

47. JHA (C.S), UPAYALAKSHMI (V) and DUTT (C.B.S). Pattern diversity assessment using remotely sensed data in the Western Ghats of India. Tropical Ecology. 38, 2; 1997, Winter; 273-83.

The article gives recent concern amongst scientists, conservationists and decision makers about the accelerated rates of regional and global species extinction necessitates the inventorying and analysis of biodiversity levels at various scales. This also discusses lack of systematic assessment of biodiversity

levels in the tropical forests in India led to the present study dealing with the pattern diversity estimation and analysis of one of the 12 mega diversity (hot spots) role of the world -- the western ghats. The remotely sensed data has been used to stratify the major vegetation types of western ghats. Each forest vegetation type was ground sampled and analysed for pattern diversity analysis.

-, REMOTE SENSING and GIS, TOOLS

48. TIWARI (A.K), KUDRAT (M) and MANCHANDA (M.L). Remote sensing and GIS : Indispensable tools for regional ecological studies. Tropical Ecology. 37, 1; 1996, Summer; 79-92.

This paper includes some of the recent applications of remote sensing and GIS techniques for carrying out regional ecological studies. It describes the critical role of these techniques in pin-pointing various ecological problems and formulating sustainable development strategies. Special emphasis is given on monitoring the spatial extent of vegetation biomass mapping, carbon dynamics, land degradation due to biotic pressure, soil reason and

environmental hazards like forest fire.

-, SOIL EROSION, RAINFALL CONDITIONS

49. SUR (H.S), MASTANA (P.S), KUKAL (S.S) and CHEEMA (H.S). Soil erosion as affected by soil and land parameters under simulated rainfall conditions. Tropical Ecology. 40, 2; 1999, Winter; 229-35.

The effect of various soil and land parameters on run off and soil loss was investigated on loamy sand soil under simulated rainfall conditions Run off was 20, 41 and 69 percent more and soil loss was 40, 106 and 180 percent more from plots with 2, 3 and 3 m length respectively than from 1 m length. Increases in slope steepness (from 2 to 6%) and antacedent soil moisture content (from field capacity to saturation) increased soil loss by 6 and 1.3 times respectively. A systematic regression analysis employing linear, power and expontential functions are fitted to the data to express empirically the relationship of soil loss and runoff with slope steepness,slope length, antecedent soil moisture content and surface cover. The relationship is best described by exponential function for estimating run

off, sediment density and soil loss with one or more number of independent variables (R^2 = 0.94 to 0.99). Inclusion of wetness parameter alongwith slope length,slope steepness and surface cover is suggested for better estimation of runoff and soil loss.

-, THREATS, ECOSYSTEM-GIR, Analysis of

50. KAMBOJ (R.D), SINGH (Mahesh) and RAVAL (B.R). Analysis of threats to Gir ecosystem. The Indian Forester. 123, 10; 1997, Oct; 964-72.

The article reveals that an indepth analysis of threats of Gir ecosystem has been attempted in this paper. The major threats to which Gir forest is vulnerable are mostly anthropogenie which inter-alia include illegal grazing by domestic livestock, encroachment in the P.A. (illegal removal of forest produce poaching, traffic and transport, pilgrimage, tourism, development of industries and large scale mining, forest fires and man-wild animal conflicts. The quantitative and qualitative assessment of these threats depicting trends in recent past have been described in detail. Narrow genetic base due to in breeding also poses a significant threat to the survival

of Asian lion. Administrative shortcomings which are proving to be a bottlenack in the efficient management of the P.A. have also been described.

-, TOTAL FOREST MANAGEMENT, NATURAL FOREST

51. SHARMA (R.C). Total forest management (T.F.M) : Innovative approach for conservation of natural forests with human face. The Indian Forester. 123, 6; 1997, Jun; 447-59.

The article shows the ever increasing anthropogenic impact, the life support system of the earth is under constant pressure. The adverse effect is reflected by way of natural resources degradation, leading to reduction in prouctivity which ends up in enhanced property and misery Poverty, malnutrition and illiteracy are the main causes of population growth that further accentuates the degradation process. This ultimately forms a vicious circle of natural resources degradation including forests. To conserve our forests, by and large forests concentration 'tree' without appreciating the interdependence of various facets of the vicious

circle. The total forests management (TFM) in an innovature approach for conservation forests, which attempts to address the malady in totality by keeping 'people' in the centre. This system is being tried in five different areas of Madhya Pradesh by developing a package of hardware of physical activities and software of human sensitivities, which help in productivity enhancement through on farm and off farm activities.

-, VAN PANCHAYAT, KUMAUN

52. MISHRA (Rajeev). Conserving the Kumaun forests through people's participation : A case study. The Indian Forester. 123, 6; 1997, Jun; 568-71.

The article reveals that conserving our forests wealth through peoples participation is the need of the hour. Concept of van panchayats in U.P. is very old. These van panchayats in U.P. have been managing their forests on sustainable basis. This paper deals with some interesting and successful van panchayats in Kumaun hills. It also brings out the problems faced by them and some other important issues that need attention.

-, WASTELAND DEVELOPMENT, PROJECT, Evaluation of, JAIPUR

53. SHARMA (N.K). Evaluation of an integrated wasteland development project in Jaipur district (Rajasthan). The Indian Forester. 123, 12; 1997, Dec; 1139-49.

The paper reveals Rajasthan is the second largest in area, 3/5th of its area lying on the west of Aravalli hills is covered by shifting sands and sand dunes known as Thar Desert. Forest area is about 9% of its geographical area. State has about 25% area as availale waste land. Therefore, there is vast scope for development for foresting and pasture development. Government of India, Department of Wasteland Development Project in Bandi Basin in Jaipur district. 2939 ha of wasteland was tackled in1994 and 1995 under various modds of treatment. This work has been evaluated by the author. Out of the area evaluated, about 78% area planted was found to be good to very good.

WILDLIFE PROTECTION ACT, 1972, GOVERNMENT, role of

54. BIST (S.S). Concept of government property in the wildlife (Protection) act, 1972. The Indian Forester. 121, 10; 1998, Oct; 761-70.

The article reveals that one of the salient features of the wildlife (Protection) Act, 1972 is the concept of 'Government Property'. This term has a specific connotation in the Act different from what a layman would understand it to be. This term holds the key to a complete understanding of many important provisions of the act. Particularly those relating to seizure of animals and other items involved in offences (section 51) and composition of offences (sec. 45). Erroneous decisions are sometimes taken by the wildlife authorities while dealing with offences against the Act owing to a misunderstanding of the term. the concept of government property as envisaged in the original Act of 1972 led to a number of anomalies and problems in the enforcement of the Act as described in this paper. Some of these anamolies and problems have since been rectified

through the wildlife (Protection) Amendment Act of 1991, but there is still a scope for rationalisation of the whole concept.

-, WILDLIFE ACT, 1972, SCHEDULES and AMENDMENTS, REVIEW

55. BIST (S.S). Critical review of the schedules of the wildlife (Protection) Act, 1972 and their amendment. The Indian Forester. 125, 10; 1999, Oct; 943-63.

The article shows the wildlife (Protection) Act 1972 provides to different species of wild animals and plants by assigning them to six schedules, each enjoying a different level of legal protection. Non-inclusion or wrong inclusion of a species in the schedules may have an adverse impact on its further. Efficient implementation of the act depends upon a careful organization and management of the schedules. In the original Act the schedules were organised on the basis of the importance enjoyed by various species as 'game'. But four amendments later, the schedules have lost their direction and thrust. The amendments in the schedules have not followed any criteria and resulted in making the schedules unwieldy

and unstable. The schedules do not bear scounting with regard to their coverage of biodiversity or representation of threatened species. There are also contradictions between the schedules and the appendices of the CITES and the Export Policy of India. The schedules also suffer from a number of toxonamic defects. Some suggestions for improving the organisation and management of the schedules have been made in this paper.

WILDLIFE MANAGEMENT SPECIAL

-, FAUNA, ANDHARI TIGER SANCTUARY

56. GHATE (Rucha). Andhari Tiger sanctuary (Maharashtra) : A case for people's participation in the management of protected areas. The Indian Forester. 124, 10; 1998, Oct; 853-60.

The article reveals that several attempts of protecting surrounding forests have been made. There is need for peoples participation in management of the protected areas through eco-development programmes by developing sense of mutual trust and understanding, so that the ecological and socical objectives could be achieved.

-,-, ASIATIC ELEPHANT, DELAYED PARTURITION, ZOO, MYSORE

57. RAJU (R), RAO (B.S. Gopal), KHADRI (S.M) and ASHA (D). Chemical manipulation of delayed parturition in captive Asiatic elephant at Mysore Zoo. The Indian Forester. 123, 10; 1997, Oct; 910-16.

The article describes the parturition wit anterior presentation is most comon among the mammals; sometimes because of abnormalities, positioning of the factors may result in dystocia. A

case of cow elephant of Mysore zoo whose parturition process got delayed because of the partial uterine inertia treated with 20 ml of oxytocin 0.5% rol/wt intravenously with 500 ml of dextrose 5% gave good response.

-,-,ASIAN ELEPHANTS, IDUKKI WILDLIFE SANCTUARY, KERALA

58. VINOD (T.R) and CHEERAN (Jacob V). Activity time budget of Asian elephant (Elephas Maximus L) in Idukki wildlife sanctuary, Kerala, South India. The Indian Forester. 123, 10; 1997, Oct; 948-51.

The article reveals that the present study on the activity time budget of Asian Elephant was carried out in 1 duble wildlife sanctuary, Kerala during 1993-94. Feeding accounted for 65.45% of the activity in dry season and 80.77% in wet season. Drinking was found to vary from 2.73% of the activity in dry season to 1.92% in wet seasons. There was a significant seasonal difference in time spent on feedig whereas it was found to be insignificant for drinking. Grazing was predominant in both dry (63.89%) and wet (71.43%) seasons, indicating the importance of

grasslands for the conservation of the species.

-,AUIFAUNA, DUDWA NATIONAL PARK

59. SALIM JAVED and RAHMANI (Asad R). Conservation of the avifauna of Dudwa National Park, India. Forktail. 14; 1998, Aug; 55-64.

The article discusses about a records of birds in and around Dudwa National Park were maintained from 1991 to 1994. The study involved intensive data collection on the bird community structure. Records from previous studies and surveys have been incorporated in this paper also. A total of 330 species were recorded from the park, of which 112 species breed in the area. The impact of the annual grassland burning and other management practices are discussed vis-a-vis conservation of some of the endangened bird species of the area.

-,-, BIRDS, ANDMAN ISLANDS

60. PRIYA DAVIDAR, YOGANAND (T.R.K), GANESH (T) and JOSHI (Niraj). Assessment of common and rare forest bird species of Andaman islands. Forktail. 12; 1997, Jul; 135-42.

The article describes a rapid assessment of

forest birds was carried out in the Andaman island in the Bay of Bengal. Forty five islands were surveyed for 47 species of forest birds. The status of each species was determined by their distribution across the island and their relative abundance. Four species were very rare, with infrequent sightings and found only on a few island. Only one endemic species, the Andman Triopioe Dendrocitta baylegi was rare. In general the status of the forest birds was robust, but the rare species that were identified need to be monitored as an indicator of the status of the forest bird community and of the forests of the Andman islands.

-,-,-, AQUATIC, PERIYAR LAKE, KERALA

61. MUHAMMED JAFER (P), BHARDWAJ (A.K), PEEYUSKUTTY (K.J) and ZACHARIAS (V.J). Studies on the aquatic birds in Periyar Lake, Kerald. The Indian Forester. 123, 10; 1997, Oct; 929-34.

The article shwos that the aimed of determining the population of aquatic birds in Pariyar Lake for making comparable studies in future. A total of 23 species of birds were recorded. Of these 17

were residents and 6 winter visitors.

-,-,-, DEHRADUN

62. SINGH (Arun P). Birds of new forest, Dehradun: Recent singhtings. The Indian Forester. 123, 10; 1999, Oct; 1035-39.

The article reveals that the author has listed 31 new records of birds from New Forest campus (4.4 km^2) and adjoining 'Tone' river bed, located at Dehradun in Northern India, alongwith their status, general abundance, habits and habitats. With these new additions the annotated check list of birds of New Forest, recorded since, 1944, now comprises of 292 species. The avifaunal richness of New Forest campus is mainly attributed to the large variety of habitats both artificial and natural, and humorous, indigenous as well as exotic, plant species found live.

-,-,-, DELHI

63. VYAS (Sudhir). Checklist of the birds of the Delhi region: An update. Journal of Bombay Natural History Society. 93, 2; 1996, Aug; 219-37.

The article describes a complete list of birds recorded from the Delhi region during the separate

periods, 1977-79 and 1984-86 is compared with previous checklists. The comparison reveals changes in status and population of various species notably sharp declines for many resident raptors such as crested Honey Buzzard, white eyed Bazzard, Tawny Eagle, Pollas's fising Eagle, King Vulture, Laggar Folcon, Fed-headed Merlin and Dusky Eagle-CW1), several riverside species (Blacknecked strock, Greater Adjutant, Great Stone Plover, Little Tern and Indian Skironer) and some passerines (Marshall's Lora, while - browed fantail Fly Cetcher, Paradise Fly catchen,. Chesthut bllied Nuthateh, White-believed Menivet, Spotted Grey Creeper and Wintering Wheatears). Six additions to the Delhi checklist are recorded, including three breeders (spotted crake, caspiar plover, drongo-cuckco, yellow bellied wren-warbler (breeder), straited March Wauler (breeder), whiletailed Bush Chot (breeder).

-,-,-, MANGROVES, BHITARKA NIKA WILDLIFE SANCTUARY

64. BIVASH PANDHAV. Bird's of Bhitarkanika mangroves eastern India. Forktail. 12; 1997, Jul; 9-20.

The article discucsses a survey of the birds of the Bhitarkanika wildlife sanctuary was conducted from Nov. 1992 to April 1993 and from July to October 1993. A total of 174 bird species was recorded, including three which had not previously been recorded in the state of Orissa. Three species recorded during the survey are restricted to mangroves forests in India. A total of 82 species showed some evidence of breeding, including the rare black-wecked strock Ephippiorhyhchus asiatic and lesser adjutant heptoptilos javanicus. A large colony of breeding herons, egrets and storks was located in the sanctuary during the surve.

-,-,-, MUDUMALAI WILDLIFE SANCTUARY

65. GOKULA (V) and LALITHA VIJAYAN. Birds of Mudumalai wildlife sanctuary, India. Forktail. 12; 1997, Jul; 143-52.

The paper describes the Mudumalai wildlife sanctuary, located between 11° 30' and 11° 39' N

and 76° 27' and 76° 43E, in the Nilgeri's district of Tamil Nadu in the western Ghats, is mainly known for its larger wild animal such as Asia Elephant (Elephas maximus), sloth Bear (Melursus urinus) and Tiger (Panthera tigris) but also harbours a good number of bird species. The sanctuary encompasses an area of 321 km^2 forming 14% of the Nilgeri Biosphere Reserve (with a core area of 72 km^2), the first biosphere reserve of India established with the view of integration of development with conservation of biodiversity.

-,-,-, WATER

66. KETAN TATU, KIMOTHI (M.M) and PARIHAR (J.S). Remote sensing based habitat availaility model (HAM) : A tool for quick look assessment of wet lands as water bird habitats. The Indian Forester. 125, 10; 1999, Oct; 1004-17.

The article describes that due to various activities of man, wetlands are facing destruction and degradation which further leads to the progressive loss of biological diversity including diversity of water birds. Under such situaiton, there is an urgent need

of monitoring and sustainably managing at least protected wetland areas on priority basis by applying modern tools and techniques. Habitat availability model (HAM) is one such model. With its grid based qualitative approach, the model may help a wetland / wildlife manager in quantitatively and quickly knowing the magnitude and spaitial distribution of habitat availability for a water bird at a wetland in 1 km x 1 km sampling plots spread over the entire wetland. In the present paper development and application of HAM has been demonstrated for the waterbird species occupying at Nal survive (Gujarat). -,-,-, WILDWATER, PAINTED STORK MYCTERIA LEUCOCEPHALA, ZOO, DELHI

67. ABDUL JAMIL URFI. Significance of Delhi zoo for wild water birds, with special referrence to the painted stock Mycteria leucocephala. Forktail. 12; 1997, Jul; 103-14.

The article describes Delhi zoo, situated close to the Yamuna river, is an important site for wild wetland birds in the Delhi region. In a field study during 1987-1992, eight species of wintering

waterfood and ten species of resting large waterbirds were observed breeding in its premises. Painted stork Mycteria leucocephald is the most prominent colonial hester of the hermonies in the zoo. Its breeding pattern was studied through four seasons. The ecological aspects of the zoo's wild water birds are viewed and from issues arising, ideas for a conservation monitoring programme are presented. -,-, BUXA TIGER REERVE, VISIT, ORNITHOLOGICAL, WEST BENGAL, REPORT, 17th Feb - 6 Mar 1992

68. ALLEN (Demod), ANDERTON (John) and KAZMIERCZAK (Krys). Report on an ornithological visit to BuxaTiger Reserve, West Bengal, India 17th Feb. to 6 Mar 1992. Forktail. 12; 1997, Jul; 47-64.

The article gives a information about a visit, in 1992, to Buxa Tiger Reserve, in an ornithologically rich area in north-east India, produced a total of 227 species, including two globally threatened and five near-threatened. Previous significant records are discussed, and a

complete annotated species list is given.

-,-, CAPPED LANGUR, NORTH-EAST

69. BHATTACHARYA (Tanmay). Capped langur of north-east India. The Twilight. 1, 6;1999, Oct; 37-39.

The article describes about capped longur (capped leaf monkey) Semnopithecus pileatusis one of the lesser known longur of India. It is found only n the north-eastern states and is strictly allopatric with the Hanuman (common or Grey / Langur semnopithecu entellus in distribution. It ranges from eastern Bangladesh (Chittangang Hill treats and Sythet) through the north-eastern states of India upto western and northern Myanmar (Burma). It was first reported by Blyth from the Tipperah Hills (Tripura) in 1847. The capped langur is large in size and robust in built. Makes are longer (body length 60-70 cm) and heavier (average weight 12 kg) than females. The capped larger inhabits dense, tropical, mixed semi-evergreen. By nature the capped larger is shy and timid.

-,-, CHICKPEA PODBORER, HELICOVERPA ARMIGERA, KEY MORTALITY

70. NATH (Paras) and RAI (Rakesh). Study of key mortality factors in the population dynamics of Chickpea pod borer, Helicoverpa armigera (Hubnu) (Noctuidae : Lepidoptera infesting Chickpea, Cicer arietinum L.). Tropical Ecology. 40, 2; 1999, Winter; 281-88.

The article reveals that the role of key mortality factors in the population dynamics of Chickpea pod borer, H. armigera (Hubner) (Noctuidae : Lepidoptera) was studied during 1989-1990 and 1990-1991 by constructing the life tables of two different generation. The action morality factors during the first and the second generation were due to failure of newly hatched larvae to survive, parasitizaiton of the gender larvae by compoletis chloridae uchida (Khneumonidae: Hymermnoptera), the older larvae by carcelia illota Curron (Tachinidae: Diptera) and the disease caused by nudean polyhedrosis virus. The mortality was more in the feringer larvae followed by the pupae and the older larvae in both the generations. The trend index in the first generation

was found positive i.e. 1.89 and 2.24 but, the negative trend index i.e. 0.78 and 0.97 was observed in the second generation during 1989-90 and 1990-91 respectively.

-,-, CHITAL and BLACK BUCK, GUINDY NATIONAL PARK, MADRAS

71. SHANKAR (T.R), MENON (R.K.G) and SUKUMAR (R). Ecology and management of chital and black buck in Guindy national park, Madras. Journal of Bombay Natural History Society. 83, 2; 1996, Aug; 178-92.

The article reveals studied population, size, density, and structure, seasonal habitat use, and feeding habits of chital and black buck in the 2.7 Guindy Nationa Park in Madras, Tamil Nadu using linetransed during 1991-92 and compared these with observations made during 1975-82 in the park. The chital population has been stable or even increased between 1975 and 1992. Artificial feeding may be responsible for low fawn and adult mortality and thus for maintaining very high chital density. On the other hand, the blackbuck population has declined sharply

from about 250 animals in 1979 toabout 85 today. Demographic changes include a lower fertility and a lower recruitment into the young male age classes. The likely causes for the decline are habitat changes in black buck territorial areas and competition with chital. Management measures such as habitat manipulation, cessation of artificial feedig, control of exotics and introduction of black buck from other areas may be needed for saving the black buck in this insular park, once considered a strong hold of this endangered species.

-,-, CONSERVATION, KANHA TIGER RESERVE

72. SHUKLA (Rakesh). Biodiversity conservation with special reference to Kanha tiger reserve. The Indian Forester. 124, 10; 1998, Oct; 819-24.

The article discusses that Kanha Tiger Reserve is one of the most promising centres of insites biodiversity coservation in the country. The reserve harbours, besides a wide spectrum of wildlife species, including some which figure prominently in the I.U.C.N, list of the threatened species, on endangered population of hard ground Barasingha, a

sub-species endemic to the Kanha and the tiger. Over the years the wildlife management practices for the conservation of wildlife in general and the above the falgship species in particular have proven very effective in reducing to a great extent the adverse effects of the known proximate causes of the loss of biodiversity in the wildlife reserve. The long history of managerial input and intervention, involving an appropriate combination of the habitat specific and specific-special approach alongwith the people cooperation and stringent protection, has contributed tremendously to the understanding of biodiversity cosnervation which emphasizes that calcualted and small disturbances lead to the highest species diversity, whereas large and hasty disturbances cause a decrease in natural species biodiversity.

-,-,-, PRIMATES

73. CHOUDHURY (Anwaruddin). Priority ratings for conservation of Indian primates. Oxyx. 22; 1990, Apr; 89-94.

The article shows the many of India's primater

are threatened, especially by forest destruction, and in some areas they are also hunted for food. The 15 species involved are not threatened euqally - some are widespread and common, even in the hearts of cities, while other survive only in small populations over a limited area. In order to make best use of the united resoruces available for primates conservation it is necessary to identify those species needing urgent attention. The author, who is at present carrying out research on the primates of Assam, has rated the species according to their conservation needs using a method based on one developed for identifying conservation priorities for African primates. He compares his results with those of the Asian Action Plan for primates and makes recommendations for conservation action in India.

-,-, COLEOPTERA, ELATERIDAE, NEW BIRD SPECIES

74. PUNAM and VASU (V). Two new species and a revised key to genus Neodiploconus hyslop (Coleoptera, Elateridaea: Melanotinae) from India. Journal of Bombay Natural History Society. 93, 2; 1996, Aug; 260-62.

The article describes about two new species from India. To the previously recorded four species of genus neodiploconus candeze from India, two new species have been added. The new species described and illustrated are N. dirangensis and N. neeruae. A key for identification of all Indian species of this genus is provided.

-,-, CRYPTOMERIAJAPONICA, SILVICULTURAL MANAGEMENT, DARJEELING HILLS

75. CHAKRABARTI (Kalyan) and ZAIDI (Azam). Silvicultural management of Cryptomeria Japonica in Darjeeling hills. The Indian Forester. 123, 1; 1997, Jan; 3-10.

The article reviews the history of plantation of cryptomeria japonica a fast growing species in

Darjeeling hills, its good and ill effects overtime. A detailed cultural and silvicultural practices had been described in details to improve the quality of plant, upgrade the ecology and as to how this practice may be a handy toolfor rural development through joint forest management.

-,-, DIUPNAL RAPTORS, BANDHARGARH NATIONAL PARK

76. SINGH (S.K). Duirnal raptors of Bandhargarh national park and its conservation aspects. The Indian Forester. 123, 10; 1997, Oct; 935-38.

The article gives diurned raptors were reported over a period of 2 years in BNP. A total of 12 species are rcorded and studies here out of total of 69 species reported from the Indian subcontinent. The problem of coservation and status of resident species in the park are discussed here. None of the resident species appears threatened, but it alteration of the habitat through deforestation outside the park that is in the buffer area, is bound to affect adversely future status of distribution of many species inside the park.

-,-, DOLPHIN, ORCADLA BREVIOSTRIS IN CHILKA LANGON, ORISSA

77. DHANDAPANI (P). Conservation of the potentially endangered Irrawady river dolphin orcadla breviorostris in Chilka Langoon Orissa, India. Journal of Bombay Natural History Society. 94, 3; 1997, Dec; 536-39.

The article describes as per the list of 'IUCN' threatened species categories' the irrawody River dolphin Orcaella brevirostris Gray, 1966, falls under 'Insufficiently known species'. Considering its localisation within restricted areas and habitats as a thin population over an extensive range, this species is recommended to be brought under 'Rain' category, particularly in the Indian subcontinent. As assessment of the present status of irrawady river dolphin in Chilka lageon, India indicates that the deteriorating ecological codition, entangling in gill nets and drag nets, and wanton killing for oil have driven this localised population almost to the brink of extinction. In order to perpetuate this species in chilka langoon, it is emphasised that, in addition to regulating the

operation of gill nets and drag nets to prevent accidental capture, breeding of a protected population in a constantly monitored seminatural impoundment set in its natural habitat is the only alternative to restore the population to its erstwhile status.

78. -,-, DUNG BEETLES COPRIS REPERTUS WALKER VEENAKUMARI (K) and VEERESH (G.K). Subsociality in dung beetles Copris Repertus walker and copris indicus grill (Coleoptera : Scarabaeidae). Journal of Bombay Natural History Society. 94, 3; 1997, Dec; 530-35.

The article discusses resting behaviour of corpris repertus and c. indicus were studied in the laboratory. Male-female corporation and parental care were observed in both the species. Earthworms belonging to Dichoguster sp. were found to feed on the dung in the broad balls. Some atypical behaviour, lies extension of broad chamber, etc. was observed in c. reporter, Biology of Corpis repertus was also studied in the laboratory.

-,-, ELEPHANT, BREEDING, SHRI VENKATESHWARA ZOOLOGICAL PARK, TIRUPATI

79. KUMAR (S.V) and RAGHAVAIAH (P.S). Modern housing facilities for breeding of elephants in Sri Venkateswara Zoological Park, Tirupati, Andhra Pradesh. The Indian Forester. 123, 10; 1997, Oct; 924-28.

The article gives the all ideal conditions were provided in all aspects like housing, bathing, drinking water, diet, medical check up etc. It is expected that these elephants will breed successfully in Sri Venkateshwara Zoological Park, Tirupati and help in conservation of this engandered species. The all facilities provided to them like housing, bathing, drinking water diet schedule and prophylactie measures are reported.

-,-, ELEPHANT CONSERVATION

80. SUKUMAR (R). Minimum viable populations for elephant conservation. Zoos Print. 8, 5; 1993, May; 7-8.

The article describes about elephant conservation. A total population of 100-200

elephants, depending on demography, sex ratio and ecological pressures, would not only have a high (> 89%) probability of survival for the next 100 years in the face of demographic and environmental stochosticity, but also be safe in the short term from genetic erosion. The goal of managers could thus be to maintain these minimum sizes in isolated elephant populatios until other options emerge in future. The figure given above are the minimum sizes recommended for short-term conservation of populations that are not under any serious danger of losting their habitat. Population viability analysis could also be usefully combined with other types of ecological analyses in deciding on management options as, for instance in dealing with elephant populations in conflict with people.

-,-,-, HUMAN INTERFACE

81. KAMAL PRASAD. Elephant conservation management and protection of human interests. The Indian Forester. 125, 10; 1999, Oct; 1040-46.

The article shows the Dehradun Shivalik belt is the north-western limit of the vast range of the

asian elephant. It is also a region which has been heavily populated in recent years and this alongwith highways hydro electricschemes on the Ganga, has greatly disrupted and reduced the effective habitat and migrations of the resident elephants. Elephant man contraventions have increased to unacceptable levels with elephants working havoc on cultivation. The Rajaj Park and which even 16 years after notification has not been declared a National park has been bisected into district sectors by highways, power channels and settlements and it can no longer sustain the large population of elephants using its tract. This article seeks to encourage thinking on new lines to mitigate this problem. The ideas and solutions suggested herein are entirely the auther's own.

-,-, FAUNAL RECOLONIZATION, SANQUELIM, GOA, pattern of

82. GANIHAR (S.R). Early successional pattern of fauna recolonization on rehabilitated iron mine sites at sanquelim, Goa. Tropical Ecology. 39, 2; 1998, Winter; 255-72.

This paper describes early successional pattern

of faunal recolonization on rehabilitated iron mine sites of sanquelim, Goa was investigated from April 1991 to August 1993. The faunal data were compared with the data of the same areas sampled prior to the revegetation programme. A total of 13,334 specimen representing 5 classes, 29 orders 97 families and 117 species of phylum Arthropoda were collected. Class insecta was found to be dominated in distribution and accounted for 95-98% of the total faunal abundance, which comprised mainly orders colooptera, Hymenoptera and Diptera. Site revegetated with mixed plant species, simulated and successional vegetation of a forest by supporting a large number of animal species with fairly good abundance in comparison with other revegetated sites, having either only shrub species or tree spcies or monoculture of Acacia auriculiformis. The results indicate that the rehabilitation of mine sites with mixed native platn species have an advantage over the sites revegetated with monoculture of exotic species like Acacia aurical lifemis.

-,-, FROG-MICROHYLA SHOLIGARE, KARNATAKA

83. DUTTA (S.K) and RAY (P). Microhyla Sholigare, A new species of microhylid frog (Anura : Microhylidae) from Karnataka India. Hamadryad. 25, 1; 2000, Mar; 38-44.

The article describes a new species of Microhyla (Anura : Microylidae) is described from Billigirrangan Hills in Chamrajanagar District, Karnataka state, south-western India. The new species is compared with congeners from India, Sri Lanka and South-east Asia, that show dilated tips of digits. Microhyla Sholigarisp. nov is distinguishable from class relatives within the genus, in processing the following characteristics : need wider than long, dilated finger tips, dilated toe tips with median longitudinal groove dorsally, webbing between distal and pen ultimate subarticular tubercles on outer and inner side of fouth toe; the district metatarsal tubordes, inner elengated and outer rounded, dorsum smooth, with light brown mid-dorsal monking, venter, white; SVL of holotype (asub adult female) 12.0 mm; of four paratypes (all females), 11.0 - 15.0 mm.

-,-, GHARIAL GAVIALIS GANGETICUS

84. ACHARIYO (L.N), KAR (S.K) And PATANAIK (S.K). Studies on captive breeding of the Gharial, Gavialis gangeticus (Gemelin) in Orissa. Journal of Bombay Natural History Society. 93, 2; 1996, Aug; 210-12.

The article reveals the gharial Gavialis gangeticus Gmelin bred in captivity for the first time at the Nandankanan Biological Park, Orissa in 1980. Since then breeding of this species is a regular feature in the park. This paper embodies data on courtship, mating, egg laggig, nests, clutch size, incubation and hatching success recorded in the park during the fifteen year period from 1980 to 1994.

-,-,GIRLION SANCTUARY, NATIONAL PARK, WOOD VEGETATION, GUJARAT

85. KHAN (Jamal A). Analysis of the woody vegetation of Gir Lion Sanctuary and Nationa Park, Gujarat, India. Tropical Ecology. 37, 2; 1996, Winter; 247-55.

This paper shows the results on vegetation classification, ordination plant species densities and species diversity of tropical dry deciduous vegetation

of Gir Lion sanctuary and National Park. The vegetation was sampled at 240 sampling points along eight line transects of total 48 km. in length in three management untis ofGir. TWINSPA produced 23 groups of plant species for whole of Gir. The second DECORANA axis explained 30.9 and 26.1% of variation respectively. The distribution of plant species on first axis indicated influence of soil moisture on plant species distribution, while the second axis indicated influence of soil type. The result are discussed in the light of prevailing biotic disturbances in Gir.

-,-, GREY WOLD-CANISLUPUS PALLIPES, FONSERVATION, MARGINAL AGRICULTURAL AREAS, SOLAPUR

86. SATISH KUMAR and RAHMANI (Asad R). Status of Indian grey wold-canis lapus pollipes and its conservation in marginal agricultural areas of Solapur district Maharashtra. Journal of Bombay Natural History Society. 93, 3; 1997, Dec; 466-72.

The article describes ecological and behavioural studies on the Indian grey wolf canis lupus pollipes

for three years in an area of 30 sq. km. at Nannaj in the Jawaharlal Nehru Great Indian Bustard Sanctuary in Maharashtra. After establishment of the Bustard sanctuary, good protection was given to all wildlife, resulting in an increase of black buck artilope cervicupra, which constitutes the major wild prey of the Indian grey wolf. The sanctuary falls in marginal agricultural areas, with numerous villages and settlements. Therefore wolf human conflicts are common. The following conservation measures for the protection of wolves : (i) better protection of core areas, (ii) protection of the denning state, (iii) livestock compensation for wolf depredotion to reduce wolf man conflict, (iv) translocation of black buck from locally abundant areas to other suitable unoccupid habitats in the sanctuary, where the wolf may also colonizes.

-,-, HARBIVOURES, CHIMMONY WILDLIFE SANCTUARY

87. JAYSON (E.A). Habitat prefereence of five herbivoures in the Chimmony wildlife sanctuary. The Indian Forester. 125, 10; 1999, Oct; 975-85.

This article shows the habitat preference of

five herbivores in chimmony wildlife sanctuary, situated in the western ghats of south India, was studied during the years 1992 to 1995. Indian procupine (Hystrix indica), Blackhaped Hare (Lepus nigricollis), Asian Elephant (Elehas maximus) Sambar (Cervus Unicolor) and wild Boar (suscrofa) showed preference for teak plantatios when compared to moist deciduous and evergreen forests. Among the herbivores studied only Porcupine and sambar significant differences in habitat use during summer and monsoon season Possible reasons for the difference in habitat use of hubivores in diseased. -,-,-, GARUMARA NATIONAL PARK, WEST BENGAL

88. SINGHAL (Niraj) and MUKHOPADHYAY (Arun). First population estiamte of some herbivores in Garumaro national park, West Bengal. The Indian Forester. 124, 10; 1998, Oct; 814-18.

The article describes that the first population estimation of six main herbirous species, e.g. Gaur, Wild Boar, Barking deer, spotted deer, Hog Deer and Sambar was carried out in Garumara national park,

West Bengal after dividing the P.A. into three major ecological habitats zones grassland, plantation and national forest. Direct sighting of animals was recorded and density of the population was determined. An area of 27.7 km^2 was surveyed out of total area of 79.44 km^2. The study indicates good density Gaur and Wild Boar in the protected area and relatively low density of sambar and spotted deer.

-,-, IRRAWADY RIVER DOLPHIN ORCAELLA BREVIROSTRIS, CHILKA LAKE, ORISSA

89. SAHU(H.K), KAR (S.K) and PATNAIK (S.K). Study on some aspects of irrawady river dolphin orcaella Brevirostris Grey in Chilka Lake, Orissa. The Indian Forester. 124, 10; 1998, Oct; 803-09.

The article gives information about Chilka wetland ecosystem in Orissa provides an ideal habitat to a small population of irrawady river Dolphins Orcadla brevirostris. Its occurrence was first recorded in Chilka by Annandale during 1915 and subsequent studies confirmed their existence in this brackish water lake. The present study deals with status, movement feeding, morphometry and behavioural

aspects of this threatened cetacean and recommends preservation of this isolated population along with their habitats.

-,-, JERDON BIRD SRI LANKA, MALLESWARA WILDLIFE SANCTUARY

90. ANAND MOHAN (B) and LAKSHMIBHARATHA (B). Redescription and review on the ecology of rare and endangered bird jerdon's or double banded courser, cursorius Bitorquatus (Blyth) from Shri Lanka Malleswara wildlife sanctuary, Andhra Pradesh. The Indian Forester. 125, 10; 1999, Oct; 986-94.

The article gives the information about the Jerdon's or double-baneled courser Crsorius bitorquatus last recorded in nineteenth century, is one of the raist birds in the world. Tis bird is indigenous to Andhra Pradesh and is restricted to Sri Lanka Malleswara wildlife sanctuary of Cuddapuh district. This rare bird believed to be extinct, has been rediscovered and found to be surviving restricted habitats and in small population. Surveys carried out in 1985 and 1986 finaly established the presence of the species in the scrub jungles near Reddipalle

village of Cuddapah district (Andhra Pradesh). In the present article redescription and review on the ecology with some mona new findings are discussed.

-,-, JOINT FOREST MANAGEMENT, SILVICULTURAL MODELS, GUJARAT

91. SINGH (H.S). Appropriate silvicultural models under the joint forest management - Gujarat State. The Indian Forester. 123, 6; 1997, Jun; 477-83.

The article discusses the Silvicultural system and operations should be modified as per requriements of the site and need of the management. Sometimes, it becomes extremely difficult to regemate and manage forest on ecological principle and compromised management under the JFM should be evolved by safeguarding immediate need of people as well as allowing continuous ecological improvement of the ecosystem. Understanding about the silvicultural system and nature would help people and forest community to prescribe appropriate silvicultural system meeting all requirement for sustenance of the joint forest management.

-,-, LEOPARD DEPREDATION, PROBLEM, CHAMOLI GHARWAL

92. DHANANJAI MOHAN. Leopard depredation problem in Chamoli Garhwal. The Indian Forester. 123, 10; 1997, Oct; 895-901.

The article shows that the Chamoli district of Garhwal is one of the three district of U.P. bordering China (Tibet) spread over an area of 9,125 km^2 the district has wide attitudinal range from less than 600 m to 7817 m (Nanda Devi Park). Three Protected Areas viz. Nanda Devi National Park (630 km^2), Valley of Flowers M.P. (87.5 km^2) and Kedounath Musk Deer sanctuary (957 km^2) are located in the distirct. The common leopard (Panthera parders) inhabits all leinds of habitats (wild adultered) in the district upto an attitude of 3,500 im. The Leopards habits bring it into far more frequent contact with man than any other predator. In the last three years 16 people have been killed by leopards and 17 have been seriously injured. 500 cattle have been killed in the last three years in or around (upto 5 km from boundery Nanda Devi M.P. and Kedounath, Musk

Deer Sen by leopards. The possible reasons behind the depreciation on humanlife an dproperty by Leoperds parks in Chamoli district have been discussed. An attempt to identify areas move prone to such indents has been made. The possible solutions to mitigate the problem have been discussed at length.

-,-, LION POPULATION, GIR

93. SRIVASTAVA (Aseem), RAMESHWAR LAL MEENA, KAMBOJ (R.D), SINGH (Mahesh), RAVAL (P.P) and PARMAR (Mukesh). Lion meta population of Gir : A report on transect survey. The Indian Forester. 124, 10; 1998, Oct; 771-82.

The article shows the population of Asian is confined to Gir where it has shown fluctuating trends in the past nienty years. Therefore, a population survey was carried out to find out its migratory route to and from zone, the corridor and its habitat and impact of animal movements on human population along the route.

-,-, LION SAFARI PARK

94. GOGATE (M.G). Conservation values of Zoological parks / safarieslion Safari park : A case study. The Indian Forester. 123, 10; 1997, Oct; 887-94.

The paper describes a case study of lion safari park in Sanjay Gandhi National Park, Pune, Mumbai indicates doubtful lineage of animals and considerable inbreeding that has led to deleterous effects. For better utilization of safari parks / zoos, as means of ex-sites genetic conservation of endangered species. These aspects need be considered, or else, diversion of already scarce resource for wildlife conservation of safari parks or zoos may be misplaced.

-,-, LION TALED MACAQUE, SILENT VALLEY NATIONAL PARK, KERALA

95. JOSEPH (Gige K) and RAMACHANDRAN (K.K). Recent population trends and management of Lion-tailed Macaque (Macaca silences) in silent valley antional park, Kerala India. The Indian Forester. 124, 10; 1998, Oct; 833-40.

The article describes that fourteen lion tailed macaque troops were identified in silent valley

national park and adjacent areas with a total 275 individuals. Of these, 8% were adult females and 45% were adult females. The population was monitored for yearly variation in the troop size. An increase of troop size was noticed in most of the cases. Management strategies to ensure the long term survival of the highly endangered lion-tailed macaque in silent valley forests are discussed.

-,-, LOSSER , CATS, MAHARASHTRA

96. GOGATE (M.G). Losser cats of Maharashtra. The Indian Forester. 123, 10; 1999, Oct; 917-23.

The article gives the information about the locations - specific authentic information status of five wild cats namely jungle cat, desert cat, leopard cat, rusty spotted cat and caracal is reported. Possible existence of fishing cat in Tansa snactuary is indicated. Need for launching specific conservation efforts for lesser cats is indicated.

-,-, MAMMALS, CHIMMONY WILDLIFE SANCTUARY

97. JAYSON (E.K). Status and distribution of larger mammals in chimmony wildlife sanctuary. The Indian Forester. 123, 10; 1997, Oct; 939-47.

The article shows the status of larger mammals in chimmony wildlife sanctuary was studied during the years 1992 to 1995; mainly based on observational methods vegetation of the sanctuary is composed of tropical well evergreen forests, tropical semi-evergreen, forests and south Indian moist deciduous forests. Twenty two species of larger mammals were recorded from the sanctuary. Rave and endangered species like lion-failed Macaque Macaca silenus (Linnceus), tiger panthera tigris (Linnaeus) and Kerala forest terrapin heosemys silvatica (Henderson) are reported for the first time from this area. As the density of herbivours was very low, it supported only a small carnivore community.

-,-, MAMMALIAN, MANIPUR

98. LAIFRAKPAM ARUNKUMAR and SINGH (H.T). Checklist of mammalian found of Manipur. The Indian Forester. 125, 10; 1999, Oct; 1047-62.

The article discusses the 78 species belonging to 66 genera, 16 subfamilies, 23 families and 10 endors alongwith their names,distributions and status of the mammalian found of Manipur are recorded and framed as a checklist. It shows that Manipur has great potential for the study of biodiversity of mammalian fauna, due to the occurrence of Indian, Indo-Chinese and Malayan elements of.

-,-, PADMAJA NAIDU HIMALAYAN ZOOLOGICAL PARK, REPORT

99. BAHUGUNA (N.C) Report on management and birth of rare animals in Padmaja Naidu Himalayan Zoological park, Darjeeling. Himalayan Paryavaran. 2, 1; 1994; 49-50.

The report describes about Padmaja Naidu Himalayan Zoological Park, Darjeeling was established in 1958 with the objective of study, conservation and preservation of the Himalayan

Fauna. The park, however, could only serve the purpose of display. The most important animals of this park are the red panda, the shaw leopard, the Tibetan wolf and the Siberian tiger. The zoo has achieved a unique distinction in breeding all this species. The red panda is the most important animal of eastern Himalayan sub-region. Now this park is being given top priority to indicate a scientific captive breeding programme and joint forest management programmes.

-,-, PEAFOWL composition of ALIGARH

100. YASMIN (Shahla). Group size and composition of Indian peafowl (Paro Cristatus) in an agro-ecosystem at Aligarh, Uttar Pradesh. Journal of Bombay Natural History Society. 94, 3; 1997, Dec; 478-82.

The article reveals variation in group size and composition of Indian peafawl (Paro Cristatus) was investigated in an agro-ecosystem at Aligarh during 1993-94. The area included a patch of scrubland and plantation surrounded by a vast xpense of crop fields. There was significant seasonal variation in group size and significant difference in group size between

'closed' habitat (scrubland and plantaiton) and 'open' habitat (crop field). This was attributed to social organization and difference in availablity of food between the habitats. Seasoned variation was found in group composition too. This was attributed to the reproductive pattern and social organization of peafawl.

-,-, PRIMATES, PARASITES, SILENT VALLEY NATIONAL PARK, KERALA

101. JOSEPH (Gigik), PILLAI (K. Madhavan), XAVIER (Francis), MICHAEL (Bindhu) and AMRITHRAJ (M). Coprological survey of parasites in two endangered primates of silent valley nationa park, Kerala. The Indian Forester. 125, 10; 1999, Oct; 1027-30.

The article reveals that the information on the parasitic load of two endangened primates,Lion-tailed Macaque and Nilgiri Langur, inhabiting silent valley National Park wave collected during the period 1994-95. Parasitic load within these primate species in capacity were also ascertained and compared with that of the wild. The major intestinal parasitic identified from the wild sample were trecharis sp. and

oesophagostomum sp. The mode of transmission and the factors affecting the terms mission of these parasites in the closed canopy conditions in the wild were discussed. the infection with these parasites may result in weak and unhealthy members in the troop and the heavier parasitic infestation may be fated to the juveniles. Thus parasitism is also a threat to the viability of the existing population of endangeed primates in the National Park.

-,-, RACPJPRIS. AMIRA and RHACOPHORIDAL, WESTERN GHAT

102. KARTHIKEYAN VASUDEVAN and DUTTA (Sushil). New species of Rhacophorus (Anura: Rhacophoridae) from the western ghats, India. Hamadryad. 25, 1;. 2000, Mar; 21-8.

The article describes a new species belonging to the genus Rhacophorus is described on the basis of four specimens collected from the western ghats of Tamil Nadu, southern India. It is diagnosed by the following characters. Moderate size (mean SVL 52.7 mm), indistinct tympanum, diameter over half of that of eye, fingers two thirds and toes full webbed, a

flap of skin on forearms, a conical flap of skin on heels, dorsum green with leaf vonation like markings and webs of fingers fellowish orange. This special resembles closely a congenric species, Rhacophorus malabaricus.

-,-, SAMBAR CERVUS UNICOLAR, PERIYAR TIGER RESERVE

103. HARIKUMAR (G), THOMAS (Bennichan), JOSEPH (K.J) and ZACHARIAS (V.J). Population dynamics of sambar cervus Uinicolar in Periyar tiger reserve. The Indian Forester. 125, 10; 1999, Oct; 995-1003.

The article reveals that the sambar in Periyar enjoys a wide distribution in the reserve. It is the major prey species of tiger and wild dogs here. Sambar was seen singly and in groups of upto about 60 individuals. They eat a variety of grasses, herbs, shrubs and leaves and fruits of various trees. The sambar in Periyar prefers grasslands, but usually avoids everygreen forests. They spend considerable time foraging in moist deciduous forests and 'savannah' type vegetation. Density of population of the species in the reserve (excluding evergreen tract)

is estimated to be 2.1/km. They spent a lot of time for feeding, mostly in mornings and evenings. Male-female ratio among adult individual was 1:3.86. Males are seen with females / herbs mostly during the reproductive season -- Dec-Jan. Mating was observed only once occasion and young ones are born in June/July months. Sambar in Periyar is threatened by several factors' diseases, poaching, tourism and grazing by domestic livastock.

-,-, SNAKES, PENIS

104. LAL (H.P). Penis in shakes. Zoo's Print. 8, 5; 1993, May; 12.

The article describes that while observing the reprouctive organs of the shaker at Sanjay Gandhi Zoological Garden at Patna (Bihar) in June 1992, it was found that adult snakes have two well developed fully functional penis. This type of penis is not found in any domestic animals.

-,-, SONE GHARIAL SANCTUARY, WEPLAND, MADHYA PRADESH

105. SHARMA (R.K) and SHARMA (Sanjay). Wetland found survey of Sone Gharial sanctuary in Madhya Pradesh. The Indian forester-123, 10; 1997, Oct; 952-57.

The article gives the information about a wetland faunal survey of some Gharwal sanctuary in Madhya Pradesh. The faunal survey conducted in Sone Gharial sanctuary of Madhya Pradesh during 1996 is reported 35 Gharials (Gavialis gangeticus) 11 Mugger Crocodiles (Crocdylus Polustris), Turtles, others, Birds and Insects sighted and described.

-,-, SPOTTED DEER, DISEASES, TIGER RESERVE PROJECT, BANDIPUR

106. YAKANTHAPPA (K) and NANJAPPA (J.A). Foot-Rot disease among free living spotted deer (Axis Axis) in Bandipur proejct tiger reserve investigation and control measures. The Indian Forester. 124, 10; 1998, Oct; 810-13.

The article describes that foot-rot disease found among free living spotted deer (Axis-Axis) in

Bandipur Tiger Reserve has been investigated for the first time. It is caused primarily due to Fasobacteria with secondary infection by Pasteurella species. Prophylactic measures are suggested for controlling the disease.

-,-, STATUS, TRIPURA

107. GUPTA (A.K). Status and management of wildlife in Tripura. The Indian Forester. 124, 10; 1998, Oct; 787-93.

The article shows that Tripura is smallest of seven north-eastern states, but because of her unique Bio-geographical and zoo-geographical position, is very rich in bio-diversity and biological resources, over the past few decades, however, various factors have adverse contributed towards wildlife conservation and management in the state. The paper records some of the unique found components of wildlife in the state and discusses about likely steps for sustainable wildlife conservation vis-a-vis meeting varied needs from diverse user groups.

-,-, STOLICZKA'S BUSHCHAT SAXICOLA MACRORHYNCHA

108. RAHMANI (Asad R). Status and distribution of stoliczka's Bushchat Saxicola macrorhyncha in India. Forkteil. 12; 197, Jul; 77-94.

The article describes stoliczka's Buschazlor while browed, saxicola macrorhyncha is a rare and local resident of the Indian subcontinent, which is listed as globally threatened. It is probably extinct in Pakistan but in India there have been a few sighting during the last 20 years. In 1993-1994, four surveys were conducted in Rajasthan and Gujarat, mainly in the Thai desert, during which 86 individuals were seen at 18 different sites. In some places it was fairly common. Some general observations on its behaviour were made and recommendations for further studies are given.

-,-, TIGER, MIZORAM

109. PATNAIK (S.S). Status of tigers outside the protected areas in Mizoram. The Indian Forester. 125, 10; 1999, Oct; 1031-34.

The article describes the status of tiger outside

protected Areas (AAs) in Mizoram has been highlighted. The hilly terrain with dense and open forests on ideal habitat for tiger. Administrative and financial constraints in (P.A) protected areas management are pointed out and strategies for effective conservation of tiger population outside protected areas (AAs) are discussed.

110. SAVANT (P.V). Status of tiger within protected areas (other than tigers reserves) in Mizoram. The Indian Forester. 124, 10; 1998, Oct; 783-86

The article reveals that the protected areas covering 544 km. are the potential habitat for the tiger. Proper management of National Parks and wildlife sanctuaries will improve the tiger population. This could be achieved with adequate financial support from the state and centrally sponsored scheme funding. Strengthening of widlife wing infrastructure development and incentive to wildlife staff will certainly yield tangible results. Meeting the challenge for protection of threatened tiger population in Mizoram, some management prescriptions have been suggested with effective

conservation measures.

-,-, TIGER POPULATION

111. VINOD RISHI. Monitoring tiger populations by impression-pad method. The Indian Forester. 123, 7; 1997, Jul; 583-600.

The article gives the information that the tiger faces a serious threat from poaching, erosion of prey-base, habitat fragmentation and degradation, excessive human interference in its habitat,dimiution of disturbance-free shelter areas and progressively increasing intensity of other ecological as well as anthropogenic stresses. Learned questimates as well as census counts of tiger populations have remained unsatisfactory excercises in providing better understanding of the constantly changing status of tiger populations in their fragmented habitas. The paper presents a field methodology for long-term regular monitoring of the tiger population in a given area. It has been designed after taking into the account the level of skill commonly encountered among the field staff deployed in protected areasin India. The methodology has been successfully tested

on limited experimental basis in Dudhwa National Parks in 1982 and Buxa Tiger Reserve in 1984.

-,-,-,-, SIMILIPAL TIGER RESERVE, FUTURE TRENDS

112. SRIVASTAVA (S.S) and SINGH (L.A.K). Future trend of tiger population in similipal, tiger reserve. The Indian Forester. 123, 10; 1997, Oct; 902-09.

The article shows the data on tiger population estimates from 1972 to 1997 have been analysed along with human population from 1971 to 1991 to regress the status of tiger population in similipal tiger reserve by the 2061. Assumptions has been made that the rate of growth of human population continus at the rat eof seen upto 1991. During observation years 1974-1997, the percent growth of tiger population followed a declining found which becomes negative after the years 2008, in spite of continuance of managerial inputs at present level. For calculation of 'Multi-Regression' the independent variables were considered to be the management gears and human population, and the substantiates earlier findings that the tiger population in similiped tiger reserve is a

population threatened by growth of human population restriction of use-area by inhabiting human population and enhancing measures for habitat improvement are suggested to possibly delay the anticipated negative trend of growth of tiger population.

-,-, TRAGOPAN BLYTHIE, CONSERVATION, NAGALAND

113. WATI AO (A.R). Status of forests and conservation approach of Tragopan Blythie in Nagaland. The Indian Forester. 124, 6; 1998, Jun; 449-452.

The article reveals that Nagaland is known for its richness in biodiversity. The state also harbours as many as 200 species of epiphytic and terrestrial orchids, many of which are rare and endangered. Under wildlife programmes, the conservation of Trogopan blythie, a rare and endangered species found in the Nagaland has been initiated to save this bird from extinction.

-,-, TURTLES and TORTOISES, HIMALAYAN RANGE

114. YADAV (M.R). Status, management and conservation of fresh water turtles and land tortoises of Himalayan range. Zoos' Print. 8, 5; 1993, May; 13.

The article describes that in our country, many of the turties and tortoises are threatened as result of over exploitation through poaching, production and illegal trade. Different habitat areas of Himalayan range belt system of north eastern part of India holds 3 families - Testudinidae, Emydidae and Trionychidae. Conservational activities should be taken at once: captive breeding, management, status survey etc. Educational and training related public awareness programmes is being taken up simultaneously. The time has come to save further and tortoises for future generations.

-,-, WILD ASS

115. SMIELOWSKI (Jan M) and RAVAL (Praduman P). Indian wild ass: wild and captive populations. Oryx. 22; 1990, Apr; 85-88.

The article describes the ghor-khar is a rare

sub species of onager, or Asiatic wild ass, and its habits are little known the only known wild population in habits the little Rann of Kutch Desert in Gujarat state in Western India and after its numbers fell aromatically in the 1960s, it was declared a protected species. Conservation measures, including the establishment of a wild ass sanctuary in 1973, have been so successful that the most recent census, in 1983, recorded nearly 200 individuals, compared with 362 in 1967. The authors made four visits to Gujarat to study wild assess between 1984 and 1986.

116. SINGH (H.S) and SONI (V.C). Status of wildlife in wild ass sanctuary (little rann of Kutch, Gujarat state, India. The Indian Forester. 125, 10; 1999, Oct; 1018-26.

The article describes the little Rann of Kutch is unique ecosystem in the world, which supports rare, endangered and endemic flora and fauna of the country. High conservation value has been accorded to the LRK by selecting area for one of the proposed biosphere reserve of the country. Change in land-

use pattern in and around the sanctuary and pouching are important threat factors responsible for degradation of the habitat and decline of the population some of the wildlife. To conserve flora and fauna of the area effectively, it has become necessary to settle all legal issues so that the sanctuary is managed as per the wildlife (Protection) Act, 1972. Although population of the wild Ass has increased and animal has dispersed in new area of original habitat. Movement of the wild ass in new area due to loss of habitat caused man-animal conflict. In background of this fact, it is necessary to improve the habitat by removing factor of degradation of the habitat and bringing back the original vegetation by eradication of prosopis from some of the areas.

-,-, ACACTA NILOTICA, SEEDLINGS, VAM COLONIZATION, status of

117. UNIYAL (Kamla) and THAPR (H.S). Status of VAM colonization in acacid nilotica seedlings of different seed origin. The Indian Forester. 123, 3; 1997, Mar; 256-59.

The article shows the response of Acacia

nilotica of thirteen different seed origi to inoculation with indigenous VAM fungi and inoculum of Glornus macrocarpum was studied under green house conditions. The frequency of VAM infection and percentage of root colonization was found variable ranging from 46% to 96%.

-,-, ALKALI, soil, performance of

118. NAIDO (C.V), SASTRY (P.S. Srinivasa) and SRIVASUKI (K.P). Performance of some free species in alkali soil. The Indian Forester. 125, 5; 1999, May; 508-12.

The article reveals that free species performance tried was conducted on alkali soils with five tropical species. All the five tree species namely acacia ferrugenea, Albizia lebbek, Azadirachta indica, Emblica officinalis and Pongamia pinnata were found to grow well in alkali soils having the value of pH 9.4 ESP 33, EC 8.1 dsm^{-1} $CaCO_2$ 5.7%. Among the five tropical trees species studied, maximum total biomass production (leaf, small branches, stem and root) was observed in Acaca ferraginea and minimum in Emblica officinalis. High survival percentage (69-

93%) in all the tree species showed better prospective for wastelands afforestation and social forestry programmes to meet the every demand as well as to maintain ecological balance and environmental stability.

-,-, ALPINE MEADOWS, LIVESTOCK GRAZING, effect of, GARHWAL HIMALAYA

119. PRAKASH KALA (Chandra) and RAWAT (Gopal Singh). Effects of livestock grazing on the species diversity and biomass production in the alpine meadows of Garhwal Himalaya, India. Tropical Ecology. 40, 1; 1999, Summer; 69-74.

The article reveals the effects of livestock grazing on the alpine (>3500 m AMSL) vegetation in Khinon valley, Garhwal Himalays was studied. The study area was stratified into three landscape units viz. undulating land masses (ULM) camping sites (LS) and steep slopes (IS). Within each stratum two bonded wire exclusures of lovio 10x10x3m (total six) were erected to exclude livestock grazing, seasonal above ground biomass production, both within and outside the exclosure, was estimated by harvest

method at 30 days interval. Plant species diversity was calculated for all the sites using shannon -- wiener diversity index and compared with similar landscape units of ungrazed sites in adjacent valleys. The loss of biomass due to grazing and trampling by livestock was 23%, 26% and 22% on CS, ULM, and SS respectively.

-,-, APPLE FLOWER, CLIMATE effect of

120. ABROL (D.P). Effect of climatic factors on population dynamics of Andrena flavipes pollinating apple flowers : A path analysis. Tropical Ecology. 39, 1; 1998, Summer; 143-47.

The flight activity of Andrena flavipes Panzer (Hymenoptera : Andrenidae) polluting apple flowers was related to some weather factors. The flight activity correlated positively with ambient temperature, light intensity solar radiation nectar-sugar concentration, soil temperature and negatively with relative humidity. Path coefficient analysis revealed whether the relationship expressed was direct or indirect. Of the six factors studied, the direct effect of ambient temperature, light intensity,

solar radiation,soil temperature were positive and that of relative humidity negative. The direct effect of rectar sugar concentration was positive and negligible.

-,-, ARUNDO DONAX, PERFORMANCE, DOON VALLEY

121. CHARAN SINGH, VINAY KUMAR and PACHOLI (R.K). Growth performance of Arundo Donax (Reed Grass) under difficult site conditions of Doon Valley for erosion control. The Indian Forester. 123, 1; 1997, Jan; 73-6.

The article deals with growth parameters and biomass production of Arundo donax under different difficult site conditions of Doon Valley, have been given in this article. Among four different site as Hill slopes of nine spoiled area (site A), old bouldery river bed lands (site B), Nala site (site C) and above galbion structure (site D), site B was found most suitable for growth of the read grass and produces maximum biomass of 2.17 kg/m^2 with highest plant growth. Site-D has parest growth performance and minimum biomass yield of 0.7 kg/m^2

-,-, AZADIRACHTA INDICA, COLLAR ROT

122. UNIYAL (Kamla). Collar rot in Azadirachta Indica and its control. The Indian Forester. 125, 5; 1999, May; 513-16.

The article gives the information during surveillance of nursery diseases a seedling diseases causing collar rot in Azo dirachta indica caused by Fusarium remitectum was recorded for the first time from Satyanarain nursery at Dehradun causing 3 to 66 percent mortality in 2 to 3 months old seedlings. Pathogenicity of fungus was tested and effect of different fungicides was tested on the growth of the pathogen invitro. Ziram and Bavistin were found most effective in checking in the pathogen.

-,-,-, JUSS (NEEM) SEEDS

123. GURUDEV SINGH (B), MAHADEVAN (N.P), SHANTHI (K), MANIMUTHU (L) and GEETHA (S). Effect of moisture content on the viability and storability of Azadirachta Indica A. Juss (Neem) seeds. The Indian Forester. 123, 7; 1997, Jul; 631-36.

The article discusses about two methods of

drying neem seeds were followed viz. sun drying and shade drying and found that the way of these two methods can be followed for drying seeds. The reduction in seed mositure has not affected the germination percent. Storing seeds with high moisture content in deep freeze condition had determins effect on the viability. Storing seeds with low moisture content in ambient and refrigerator condition was recommended.

-,-, BAMBOOS, LABORATORY EVALUATION

124. MISHRA (S.C) and THAKUR (M.L). Laboratory evaluation of natural resistance of Bamboos to termites. The Indian Forester. 124, 12; 1998, Dec; 1043-46.

The article describes the Bamboos, the most versatile forest based natural resource, play an important role in the national economy of many countries, particularly these lying in the south Asian pacific region. Unlike many timber species, no authentic data is available on the natural resistance of bamboos against borers and termites. Forest Research Institute - Dehradun has carried out some

pioneering work on this aspect and result of laboratory evaluating of natural resistance of 13 species of bamboos is presented have against the test termite microcerotermies beesoni Snyder The natural resistance of these species is more or less comparable to some of the moderately durable commercially important timber species, such as Anogeissus latifolia, Ganga pinnata and shorea robusts etc. The outer layer/ vivid of bamboo is highly resistant and termits normally invade bamboo from the cut end portion only.

-,-, BAMBUSA BAMBOS, MICRO PROPAGATION, technology of

125. ARYA (Sarita) and SHARMA (Sushma). Micropropagation technology of Bambusa bambos through shoot proliferation. The Indian Forester. 124, 9; 1998, Sep; 725-30.

The article shows the Bamboos are vesatile multipurpose forest produce which play a vital role in our domestic economy. Bambusa Bambos is the principle source for paper and pulp besides being used for constructional purposes and provides food

mutuals. The conventional methods of its propagation have a lot of problems which restrict its multiplication on a large scale. A tissue culture technology is developed for large scale multiplication of Bambusa bambos wihch is discussed.

-,-, BANANA PLANT, VIRUS, SOOTH-WEST

126. PADMALATHA (C) and RANJIT SINGH (A.J.A). Phidophagus Coccinellides on Pentalonia nigroneivosa, a vector of bunchy top virus in the banana plants of south-west India. Tropical Ecology. 39, 2; 1998, Winter; 239-42.

The article describes in the era of integrated pest control using biological agents, information on the pendatory potentialities of Coccinelids sp. on a banana aphid, pentatoria, nigronurosa, a vector of bunchy top disease virus is important. The aphidophagus Coccinellids. were continuously observed for two years in the selected fields at Karyavatam of the Kerala state. Total member of a phid colonies and number of colonies having predators were noted. The larval Coccinellids were caught along with some aphids and reared in the

laboratory till they become adults in order to facilitate their identification. Seven species of Coccinellid were found in aphid colony. Of these six species are new record from Kerala and one species is a new record from India. A correlation between the aphid colonies and predator population was traced for 2 years.

-,-, BIO-DIVERSITY, FOREST FIRE and BIOTIC INTERFERENCE, impact of, EASTERN GHATS

127. SRIVASTAVA (Rajeev K). CHIDAMBARAM (K) and KUMARAVELU (G). Impact of forest fire and biotic interference on the bio-diversity of eastern ghats. The Indian Forester. 125, 5; 1999, May; 439-44.

The article describes the impact of forest fire and biotic interference on biodiversity of the eastern ghats due to human interference and non-arrival conflict have been discussed. The part of eastern ghats which play a vital role in the Nilgiri Biosphere Reserve, one of the first and finest biospheres in India, is now facing mounting problems in the hands of human beings.

-,-, BLUE PANIC GRASS, SEED, GERMINATION and PRODUCTION

128. PARIHAR (S.S), AGARWAL (Prabhita) and VINOD SHANKAR. Seed production and seed germination in blue panic grass (Panicum antidotale (Retz). Tropical Ecology. 40, 1; 1999, Summer; 75-48.

The article reveals the seed field components of P. antidotale were examined during monsoonal growth for two years (1995 and 1996). Initial head emergence (IHE) started by 1st week of August, about 35 days after the start of monsoon growth from the last week of June. The head density peaked during 4th week of August to 58.7 m^{-2} with PGS (pure germinating seed) yield of 269 kg ha^{-1} yr^{-1} in the year 1 and 72.5 m^{-2} with PGS yield of 275 kg ha^{-1} yr^{-1} in year 2. Fresh seeds showed dormancy and required an after vipenning period of about six month. Dormany of seeds was broken by the chilling, GA_3 KNO_3 and H_2SO_4 treatments.

-,-, CASUARINA EQUISETIFOLIA, COLANAL MATERIAL, GENETIC ASSESSMENT

129. ASHOK KUMAR and GURUMURTHI (K). Genetic assessment of colonal material of casuarina Equisltifolio. The Indian Forester. 124, 3; 1999, Mar; 237-42.

The article shows the Institute of Forest Genetics and Tree Breeding, Coimbatore, pioneering work was carried out by establishing the clone bank, comprising 55 Clonal selections, of Casuarina equiselifolia. Of these, 42 clones were planted for the evaluation in completely randomised design at the clonal testing area (CTA) of the institute. The data recorded at 12 month of age for plant height, diameter at ground leve (DGL), diameter at brest height (DBH) and mean bole volume (MBV) showed significant genetic variation among the clones. The broad sense heritability and genetic advance was calculated for all the parameters recorded. Co-heritability values for six combinations of traits was worked out and are presented. The results on interim assessments of clonal performance suggest large yield

improvement possibilities in this species.

-,-,-, FRANKIA, effect of

130. ASHOK KUMAR and GURUMURTHI (K). Effect of Frankia on growth and nodulation in Casuarina Equistifolia. The Indian Forester. 125, 5; 1999, May; 499-95.

The article shows the effect of symbiotic association of three Frankia strains on growth, biomass and nodulation was studied on 10colones of casuarina equisetifolia in a nursery experiment. Significant improvement was observed after 90 days of inoculation with all the Frankia strains. Of them, ORS 020607 was found to be the most effective strain on all the characters studied except root length. The most promising association was recorded between strain ORS 020607 and casuarina clone CHCE 890903. Frankia inoculated clones recorded 93, 51 and 116 percent improvement in short length and dry matter production, respectively at 90 days after inoculation.

-,-, CHIRPINE FOREST, MINERALIZATION and INORGANIC-N, CENTRAL HIMALAYA.

131. USMAN, SAMINA, RAWAT (Y.S) and SINGH (S.P). Mineralization and inorganic-N uptake in chirpine forest of Central Himalaya. Tropical Ecology. 39, 2; 1998, Winter; 193-99.

The article gives Net N- mineralization and nitrification rates were measured by in situ incubation of soil in a needle leaf forest in central Himalaya. The seasonal pattern for both nitrification and ammonification was similar. Rainy season conditions were more favourable for N-mineralization. The size of the availale nitrogen pool ranged from 8.30 ug g^{-1} with maximum values in the dry peirod (summer season) and minimum value during the wet period (rainy season). The trend for N-mineralization rate was opposite to that of the size of the available N.

-,-, CINNAMOMUM CAMPHORA, BIOMASS

PRODUCTIVITY and DISTRIBUTION

132. RAKA SINGH and NEGI (J.D.S). Biomass predictivity and distribution of organic matter in natural cinnamomum camphora stand. The Indian Forester. 123, 12; 1997, Dec; 1161-68.

The article reveals biomass production and distribution of organic matter in different components of cinnabiomum camphora tree species was studied. Correlation coeficient and regression models were worked out separately for each biomass component and the total above ground biomass. Among the predictor variables tired, D^2H was found to be the most reliable parameter for predicting biomass. The total standing above ground biomass of c. Camphora stand is 104.0 tonnes/ha. Contribution of different tree components to the total above ground biomass is in the following order: Bole > Twigs + Brand > Leaves > Fruit.

-,-, CLONAL TECHNOLOGY RESEARCH and DEVELOPMENT PROGRAMME

133. PIARE LAL, KULKARNI (H.D), SRINIVAS (K), VENKATESH (K.R) and SANTHA KUMAR (P). Genetically improved clonal planting stock of eucalyptus : A success story from India. The Indian Forester. 123, 12; 1997, Dec; 117.

The paper describes success story of clonal technology research and development programme for genetic improvement of planning stock of ecualypts. Through vegetative propagation and cloning techniques being implemented since 1989. Comparative data in respect of adaptability and growth rates have been presented and discussed. Details of most promising clones called 'Bhadrachalam' clones of eucalypts selected for large commercial multiplication, with their origin and performance in various trials have been given. Progress of eucalypts plantations, major constraints and factors contributing to success have been described. Development and deployment of genetically improved, high yielding, fast growing and

disease resistant 'Bhadrachalam' clones of eucalptus on commercial scale for the first time in India, by a private sector company, ITC Bhadrachalam Paper boards Limited, have been highlighted.

-,-, CORBETT TIGER RESERVE, ECOLOGICAL OBSERVATIONS

134. RAWAT (G.S), GOYAL (S.P) and SINGH (A.J.T. John). Ecological Obervations on the Grasslands of Corbett Tiger Reserve, India. The Indian Forester. 123, 10; 1997, Oct; 958-63.

The article reveals that two grasslands (chaurs) in the core area of corbett tiger reserve ere studied to compare the species of composition, frequency and distribution of grasses, herbs and weeds. The study revealed also that less frequently burnt charus first site, i.e. Dhikala had high frequency of weeds and tree samplings. On the other hand, the low lying wet grassland showed a different species composition. The frequency of grasses was significantly lower in the area of seasonal inundation compared to elevated grasslands of Dhikala Chaurs ($t = 2.899$, $p = < 0.025$). Since elevated and low

lying grass levels represent different ecological conditions, these would require different management practices. Weeds in low lying wet areas can be eradicated by planting negative fall grasses and weeds rather than attempts of burning.

-,-, COLUTEA NEPALENSIS SIMS DESERT

135. SINGH (R.P) and JISHTO (Vaneet). Colutea Nepalensis Sims : An important shrub of cold desert region of India. The Indian Forester. 123, 7; 1997, Jul; 637-42.

The article shows a study was conucted in the cold desert region of India in the state of Himachal Pradesh and Jammu & Kashmir. Colute nepalensis sims attains an average height of 1.20 m with 2.50 m^2 average crown area. The shrub provides effective soil cover and binds soil over an area of 3.25 m^2. The contribution of above ground biomass was maximum (51.61%) to the total biomass followed by root biomass (42.39%). The paper rate varies from 0.2% to0.42 in tap-root and 0.17 to 0.30 in lateral root, which itself is an indication of the strong root system of the species. Stem cotributes maximum

energy content (4400.0 cal/g weight) followed by root (4000.0 cal/g dry weight and leaves (3270.0 col/g dry weight) in descending order.

-,-, COMPOSITION and VEGETATIONAL DIVERSITY, GARHWAL HIMALAYA

136. RAIZADA (A), JOSHI (S.P) and SRIVASTAVA (M.M). Composition and vegetational diversity in an alpine grassland i the Garhwal Himalayas. Tropical Ecology. 39 1;1998, Summer; 133-41.

This paper describes vegational compsotiion and diversity were studied in the alpine grassland at Panwalikantha (3963 m) in Garhwal Himalayas, which is intensively grazed in the summer months. Seven district plant communities were identified.. Importance value index (IVI), sorensor's similarity index, shannen's diversity index (H'), concentration of dominance (d) were calcualted and cluster analysis of samplings units was carried out species richness was highest (42) in the moderately grazed plot and least in the intensively grazed plot. Diversity (H') was also the highest in the moderately grazed plot (3.0) and least in the grazed site (1.58). Under cotninued

grazing Danthenia cachmeriana and saxitraga androsacea was replaced with carex nubigend and trachydium roylei. Results indicate that intensity of grazing directly affects species occurrences and diversity. Moderate grazing increased and continued protection decreased species diversity, while unchecked grazing led to disappearance of several species, and thin graduate replacement with unpalatable herbs.

-,-, COURTALLUM RESERVE FORREST, WESTERN GHATS

137. PARTHASARATHY (N) and KARTHIKEYAN (R). Biodiversity and population density of woody species in a tropical evergreen forest in Courtallum Reserve forest, Western Ghats, India. Tropical Ecology. 38, 1; 1997, Winter; 297-306.

The article reveals that a hectare of tropical wet evergreen forest in courtallum R.F., southern western ghats was inventoried for diversity, density and population structure of all woody species. A total of 482 stems covering 57 species in 47 genera and 32 families were recorded at greater than 30 cm gbh.

Stand based area was 42.61 m^2 ha^{-1}. Four tree species which dominated the stand include Gordonia obtusa (density 79), Conthium ficiforme (72), Neolisted cassia (57) and Garcinia gammi-gutta (32).These formed nearly 50% of the total stand density, 56% of the stand basal area and together scored an IVI of 147, Based on species contribution Euphorbiaceae, Myrtaceae, Ebenaceae, Rubiaceae were well represented.

-,-, QUERCUS LEUCOTRICHOPHORA and ALNUS NEPALENSIS

138. JOSHI (Asha) and SINGH . (S.P). Responses of Quercus leucotrichophora and Alnus nepalensis seedlings along a nutrient gradient. Tropical Ecology. 39, 1; 1998, Summer; 117-23.

The article discusses the responses of Quercus leucotrichophora loak and Alnas nepalensis (older) seedlings have been observed on a nutrient gradient. Five nutrient levels maintained as :young low (N_1) - 130 mg/kg; low (N_2) - 520 mg/kg; intermediate (N_3) - 1120 mg/kg; high (N_4) - 1560 mg/kg and very high (N_5) - 2080 mg/kg range of nitrogen. Height growth

and dry mass of oak seedling increased upto N_4 nutrient levels and then decreased at N_2 nutrient level in both the cultures, whereas for older in pure culture neight growth and dry mass was declined throughout the nutrient gradient. Dry mass of the oak seedlings showed positive significant correlation ($P < 0.01$ and 0.05) with total soil nitrogen in both the cultures while these are insignificant for older.Responses breadth was narrow for older(0.774) than for oak (0.823).

-,-, CULTIVATION, EASTERN GHATS

139. SRIVASTAVA (Anil K). Alternate land uses for shifting cultivation in eastern ghats. The Indian Forester. 123, 3; 1997, Mar; 218-32.

The paper deals with shifting cultivation is prevalent in Orissa, followed by Manipur, Meghalaya, Arunachal Pradesh, Mizoram, Andhra Pradesh, Assam, Madhya Pradesh, Tripura, Bihar and Nagaland, over more than 4 million ha of land. In Orissa, itis practiced in six agro-ecological zones, which one grouped under subhuid red soil eastern ghats highland agro-eco-region. Koraput, Phulbani

Kalahandi, Ganjam and adjoining Keonjhar and Sandergarh districts have been effectd by shifting cultivation involving 0.69 million families and 3 million ha land. Possibilities of improving shifting cultivation and alternate land use for the region are presented in this paper.

-,-, ECOSYSTEM, CENTRAL HIMALAYA

140. UPADHYAYA (V.P), SINGH (R.P) and RANA (B.S). Soil respiration in distributed forest ecosystems of central Himalaya. The Indian Forester. 123, 1; 1997, Jan; 77-82.

The article describes that an in situ soil respiration study was conducted in land slide damaged and undamaged pine and oak forest of central Himalayato evaluate the seasonal difference in CO_2 evolution in different components of soil system. Higher respiration rate were observed in rainy season (September) acrossall sites followed by summer and low in winter season.Soil respiration on 8 and 30 year old damaged sites was 86 and 20% less than the undamaged site, respectively Bulk density, soil N concentration and air temperature

explained 90, 78 and 80% variability in total respiration The respiration rates of central Himalaya forests roughly equal the respiration rates of tropical rain forests.

-,-, ECTOMYCORRIZAL FUNGI, ANDHRA PRADESH

141. VIJAYA KUMAR, REDDY (B.V. Prashad) and MOHAN (V). Distribution of Ectomycorrhizal fungi in forest tree species of Andhra Pradesh, southern India : A new record. The Indian Forester. 125, 5; 1999, May; 496-502.

The paper gives the information about Ectomycorrhizal fungi are commonly occurring in most of the conifers and a few angiosperms. In the present investigation, three different ectomycorrhizal fungi viz., Pisolithus tinctonus, sclarodermoa sp. and Thelephora ramanoides were recorded in association with Acacia spp. and Ecicalyptus spp. plantations in low fertile soils of Andhra Pradesh. The frequency distribution of these fungi in association with different tree species was recorded. Root samples were processed for identification of these fungal

associations, significance of these findings is discussed.

-,-, ENDANGERED PLANTS, conservation of

142. RANJIT DANIELS (R.J) and JAYANTHI (M). Biology and conservation of endangered plants : The need to study breeding system. Tropical Ecology. 37, 1; 1996, Summer; 39-42.

The article shows that the researchers are exploring the possibility of mass multiplication of endangered plant species using micropropagation techniques and studying variation using molecular technique. One of the primary concerns of conservation biologists dealing with protected and review duced endangered species is the in situ maintenance of natural and introspecific variations. The extent of genetic variation in plants is basically determined by their breeding system. In this paper discuss the various breeding systems of higher plants in general, laying special emphasis on endangered flowering plants. This paper highlights the need to undertake detailed studies of the concerned plant's breeding system to enable serious efforts in its in situ

conservation achieved their desire goals.

-,-, EUCALYPTUS Rooting response of

143. BAKSHI (Meena). Rooting response of coppice shoot nodal cuttings of Eucalyptus hybrid as influenced by season. The Indian Forester. 124, 12; 1998, Dec; 1032-38.

The paper discusses the seasonal variations in coppice shoot production capacity and rooting / sprouting behaviour of coppied shoot nodal cuttings was studied in adult eucalyptus hybrid trees. The results reveal that the best period of coppicing is Feb/Mar and the best period of excision of coppice shoots and planting is May-Jun. The best treatment for maximum vegetative propagate production is Indole butyric acid 4000 ppm.

-,-,-, CAMALDULENSIS, IRRIGATION CONDITIONS

144. UPADHYAYA (A.K) and SONI (R.G). Growth biomass production and dry matter distribution pattern of Eucalyptus camaldulansis growth under irrigated conditions in ighp area of Rajasthan. The Indian Forester. 123, 3; 1997, Mar; 190-95.

The article provides information regarding

growth parameters, pattern of organic matter distribution and contribution of various parts towards total biomass of five year old Eucalptus camadulensis plantation growth in IGNP area of Rajasthan aspacing of 2m x 2 m. the tree height varied from 5 m to 20 m ad girth at breast height ranged from 15 to 69 m. Average girth and height of the plantation being 13.55 m to 12.01 m respectively. The higher girth classes contained higher percentage of bole-wood and utilisable biomass and less of hom-utilisable biomass. The total biomass yield was 185.12 even dry tonne per ha whereas, utilisable biomass were 147.19 were dry tonne per ha.

-,-,-, ODORATUM

145. YADAV (A.S) and TRIPATHI (R.S). Studies on the demography of Eupatorium odoratum in a secondary successional communit. Tropical Ecology. 40, 2; 1999, Winter; 269-73.

The paper gives survivorship of different age groups population flux, and age structure of Eupatorium adoratum L. population have been studied in permanent quadrate fortune and half years

in a five year old follow. The longevity of established population increased with age of individuals. The increasing influence of established populations increase plants of E.odorcitum and other associated species such as imporata cylindrica, adversely affected the survival of seedling population. The results indicate that the population of E. odoratum begins to decline after six years in a secondary successional community.

-,-,EUTECTONA MACHAERALIS WALKER, SKELETONIZER, TEAK CLONES

146. ROY (C.N), JAIN (Avinash), JOSHI (K.C) and LAL (R.B). Natural resistance in teak clones to leaf skeletonizer Eutectona Machaeralis Walker : An appriasal. The Indian Forester. 123, 11; 1997, Nov; 1027-34.

The article describes that research accomplishments on natural resistance in teak clones against its prime insect pest, E machaeralis walker (Lepidoptera : Pyralidae). It succinetly describes the importance of this insect pest, modern concept of host resistance mechanism and necessity for

identification of resistant genotypes in practical utilization. Much emphasis has been given on evaluation of resistant teak clones against leaf skeletonizer and the factors responsible for natural resistance in teak clones have been highlighted. Use of resistant teak clones may offer a viable long term solution to the leaf skohetonizer menance.

-,-,FLLED SPRUCE, WESTERN HIMALAYAN

147. SINGH (Arun P) and BHANDARI (R.S). Colonization, succession and preference for tree portion by insects on felled West Himalayan spruce, Picea smithiana. The Indian Forester. 123, 10; 1997, Jul; 656-63.

The article studies on colonization, succession and preference for free portion by insects were carried out on felled free of spruce Picea sonithiana trees. A total of 14 species of insects colonized the filled trees. Two species are important wood boring beetles,Tetropium oreinum and dry ocetesindices which infest freshly felled trees. Asap / fluid feeding bugmezira tenuicornis also feeds on the tree till the 3 years followed by decaying wood boring fly/ Eristalis tenase in the 4th year after filling. Five

species of predating beetles were also collected. However, from 18 to 22 years after felling, 3 species of belts that are borors of rotten wood, Hemisodrocus repalinsis, onyctes nasicomis and Blaps socio-feed on spruce. Preference for the free portion by insects showed that during the first 2 years after felling all the three portions of the tree are colonized, i.e. bottom middle and top. While from 3 to 8 years the bottom and middle portions are inhabited by insects. However, from 18 to 22 years after felling insects infest the bottom portion of the tree.

-,-, FOREST PLANTATION, CONSERVATION

148. SUNDARAPANDIAN, CHANDRASEKARAN (S) and SWAMY (P.S). Variations in fine root biomass and net primary productivity due to conversion of tropical forests into forest plantations. Tropical Ecology. 40, 2; 1999, Winter; 305-12.

The article shows the changes in fine root biomass and net primary productivity (NPP) following conversion of tropical forests (evergreen and deciduous) into forestry plantations (Teak, Acacia,

Albizia, Rubber) were studied at Kodaya in western ghats, south India. Through five (< 1 mm) and five (1-3 mm) root biomass and NPP were altered in plantations. Similarly NPP also greater in natural ecosystems (476 and 527 gm^{-2} $year^{-19}$ compared the plantations (368, 293, 320 gm^{-2}) teak plantations (463 gm^{-2} $year^{-1}$). This could be attributed to trace desnity and basal area alongwith greater litter accumulation. The lower biomass and NPP in plantation ecosystems could be attributed to species composition, low orgenic matter and soil fertility. Recurrence of annual fine could lead to reoccupation of land by grass cover. This may be the reason for greater below ground biomass and NPP in deciduous forest and teak plantation.

-,-,-, TARAI REGION, UTTAR PRADESH

149. JOSHI (C.S), SINGH (R.P) and RAO (P.B). Pattern of leaf litter decomposition in forest plantation of Tarai region in Uttar Pradesh, India. Tropical Ecology. 40, 1; 1899 Summer; 99-108.

The article decribes that the leaf litter decomposition in tree plantation of eucalyptus

hybrid, Grivellia robusta A cunn. Leucaena Lecucocephala (Lam) de wit, Pinus sroxbernghiisong, populus deltioidos marsh and tectona grandis linn. was studiedin the Tarai region of Kumaon Himalayas (Central Himalaya) to examine: (i) the rate and seasonal pattern of decomposition, and (ii) the relationship between rate, litter quality and environmental factors. The upper layer of soil is rich in organic carbor (2.6 - 6.3%) and potassium (347-517 kg ha^{-1}). Monthly reinfall and temperature could account for 37-85% and 39-57% of monthly weight loss of litter. The different combinations of temperature, rainfall relative humidity and evaporation on weight loss produced on r^2 of 0.48 - 0.89. Te nutrient concentration of N, Park on percent weight loss explained 30-60% of the variability whereas the combinations of N_1 P and K and climatic variables on percent weight loss produced on r^2 of > 0.77.

-,-, FUELWOOD, ANOGEISSUS LATIFOLIA and TERMINALIA TOMENTOSA, YIELD TABLE

150. KHANNA (P), PACHOLI (R.K) and SINGH (V.P). Fuelwood and leaf fodder yield tables of Anogeissus Latifolia and Terminalia Tomentosa. The Indian Forester. 124, 3; 1988, Mar; 198-205.

The article describes that Anogeissus latifolia and Terminalia tomentosa are commonly loped for leaf fodder in shiwalik hill region of Haryana. During present study the leaf fodder and fuelwood yield of these two three species were measured and field tables were prepared on using suitable regression equations. Leaf fodder yield was more in T. Tomontosa while fuelwood yield was more inA. latifolies.

-,-, FUNGI, WOOD-DECAYING

151. HARSH (N.S.K), BISHT (N.S) and TIWARI (C.K).Two new wood-decaying fungi from India. The Indian Forester. 123, 11;1997, Nov; 1001-06.

The article describes that most of the wood-decaying fungi belong to the order Aphyllophorales of Basidiomycetes. They play an important role in

carbon recycling and help in making the complex compounds available to the plants in simpler forms after degradation of wood and other lignocellulosiasis materials. Two new wood decaying fungi namely Hexagonia volutina and Microporus vernicipes belonging to the order Aphyllophoroles are being reported for the first time from India.

-,-, GANGA, DIARALAND, DECOMPOSTION, BHAGALPUR

152. VERMA (H.K). Mixed leaf litter decomposition in Diara land of Ganga basin at Bhagalpur, Bihar. The Indian Forester. 123, 1;1997, Jan; 83-6.

The article deals with monthly and progressive data of weight loss of mixed leaf litter kept in nylon bags on the diara floor showing maximum decomposition during rainy season 58.3 percent. The turn over or time required to decompose the residual leaf litter was 107 days. Analysis of variance between months and drug weight of litter was found significant ($P < 0.001$) and the variance ratio (F) was 35.9956.Decomposition constant (K) of mixed leaf litter was 3.39.

-,-, GERMINATION PATTERN, GARHWAL HIMALAYA

153. NEGI (A.K) and TODARIA (N.P). Effect of seed size and weight on germination pattern and seedling development of some multipurpose tree species of Garhwal Himalaya. The Indian Forester. 123, 1;1997, Jan; 32-6.

The article deals with the influence of seed size and weight on seed germination behaviour and development of Aeroblongum, kydia Colyciana, Terminalia tomentosa, T. beleerca T.Chebula have been investigated. Heavy and large seeds of T. beleried and A. oblongum performed better in terms of germination pattern while T. belerica and T. tomentosa gave better results in terms of seedling development after 3 months and 6 months respectively.

-,-, GRASSES, PERIYAR TIGER RESERVE

154. AUGUSTINE (Johmy), SASIDHARAN (N), BHARDWAJ and RAJESH (K.P). Grasses of Periyar Tiger Reserve. The Indian Forester. 124, 10;1997, Oct; 861-66.

The article shows that Periyar Tiger Reserve

is known for its rich fauna, particularly large mammals. Grasses from an important food resoruce for the wild animals. During the studies on the flora of the Periyar Tiger Reserve, 163 species of grasses belonging to 74 genera were collected including seven species which have not been recorded earlier from Kerala. The species are listed in alphabetical order. The nomenclature is made up to date. Important synonyms are also provided. Analysis with respect to endemism and rarity is also given.

-,-, GREWIA OPTIVA DEUMMOND, SEED PARAMETERS and GERMINATION

155. TYAGI (P.C), AGARWAL (M.C) and NIRMAL KUMAR. Provenance variation in seed parameters and germination of Grewia Optiva deummond. The Indian Forester. 125, 5; 1999, May; 517-21.

The article describes the statistical computation on seed traits and germination of the provenances revealed the existence of genetic variability. The correlation between different pairs of charaters were determined and observed highly significant. The multiple regression equation using step down

regression technique revealed that the seed length of 100-seed weight might be used as the predictors of germination in Gruira optiva.

-,-, HARVESTED BAMBOOS, GHOON BARERS, protection of

156. THAKUR (M.L) and BHANDARI (R.S). Recent trends in protection of harvested bamboos from ghoon bares. Journal of Bombay Natural History Society. 94, 3; 1997, Dec; 525-29.

The article shows that in India, harvested bamboos suffer in varying degrees, from different species of ghoon borers at the felling site and under storage conditions. Severely infested bamboos are often reduced to heaps of dust, causing a colossal loss in revenue to the growers and the industry. Protection of bamboos has been an important thrust area of forest research since world war II. The Forest Research Institute, Dehradun, has played a pioneering role in developing approriate technologies for protecting bamboos from insects both for short (prophylaetic treatments) as well as long duration (preservation treatment). This paper discusses the

results of some of the recent researches carried out at the Forest Research Institute, particularly on the use of synthetic pyrethroids which, though easily biodegradable, have been found highly effective as prophylaetic measures against ghoon borers.

-,-, HERBACEOUS PLANT, DRY TROPICAL SAVANNA, SOIL WATER, effect of

157. PANDEY (C.B). Effect of soil water and grazing on herbacious plant cover and cover : Biomas relations in a seasonally dry tropical savanna. Tropical Ecology. 39, 2; 1998, Winter; 201-09.

The article reveals that the effect of three levels of grazing, viz. no grazing (completely protected), free range grazing (unprotected) and seasonally restricted grazing (seasonally protected) wore studied in three saranna sites. Live shoot and dead shoot cover showed a bionodal pattern in their seasonal variation under all the three levels of grazing. Live shoot cover and canopy cover were positively related to gravimetric soil water, however, dead shoot cover was inversely related to gravimetric soil water. Free range grazing (unprotected) reduced

an average annual live shoot cover, dead shoot-cover, canopy water, live shoot biomass, dead shoot biomass and canopy biomass and weakened the effect of gravimetric soil water. The effect of grazing was greater in winter season than that in rainy season. Seasonally restricted grazing (seasonally protected) stimulated live shoot cover and increased soil water utilization per unit live shoot cover / biomass production.

-,-, HINGOLGADH NATURE EDUCATION SANCTUARY, STUDY

158. SINGH (H.S). Study on biodiversity on Hingolgadh Nature Education sanctuary. The Indian Forester. 124, 10; 1998, Oct; 825-32.

The reveals that that biodiversity study on Hingolgadh Nature Education sanctuary shows that the biological spectrum of the area is close to that of dry deciduous thron scrubaed dry Savannah like vegetation. Remote sensing study on vegetation cover indicate that canopy density has improved progressively after severe drought in year 1987, due to fair regenerated of Acacia sevegal. The small area

is exceptionally rich in floral and faunal density as indigenous flora of the sanctuary in represented by 63 families, 189 genera, 286 species, expressing a ratio of 1:3:4:5. The sanctuary also also supports high divesity (212 species) and very high density (1967 birds/km^2) of birds, alongwith other rich founa. Comiphora wighhii, an endangered species and other locally threatened. species have started recovering due to improvement of the habitats. The variety and threat level for various species have also been assessed in this paper.

-,-, HYMENOPTERA, role of

159. JOSHI (P.C). Population dynamics and biomass of hymenoptera in a temperate grassland. The Indian Forester. 123, 3; 1997, Mar; 245-48.

The article describes the role of hymemoptera in pollinating the flowers in well recognised. They appear to have an important influence on other parts of the grassland ecosystem by supplying food for consumers.The other important function of these insects is the transfer of nutrients and energy from the primary producers to the decomposers.

-,-, IRON ORE MINE, GOA, SURVEY

160. RODRIGUES (B.F). Survey for potential tree species for revegetation of iron ore mine wastelands of Goa. The Indian Forester. 123, 3;1997, Mar; 233-35.

The paper deals with reports survey of tree species found in the already distributed areas of iron ore one mine lands of Goa. In all 64 trees species have been reported. The study helps to identify potential tree species which have survived the in hospitable conditions of the mines. These selected species an then be extensively used in the revegetation programmes of the iron ore mine wasteland.

-,-, ISOLATE DIXITEI SHENDE, SOIL, GROWTH PERFORMANCE, WESTERN GHATS

161. WAGAI (S. Otieno), SRIVASTAVA (G.K) and SRIVASTAVA (Mrittinjai). Soil in relation to distribution and growth performance of Isoetes dixitei Shende in the western Ghats of India. Tropical Ecology. 38, 2; 1997, Winter; 317-22.

This paper discusses in soil collelcted from the natural habitats of I. dixitei shende have been

analysed for the available plant nutrients. The amount of nutrients have then been correlated with the growth performance of this species. The proceeding analysis reveals that the habit of plants of I. dexitei are influenced by many overriding soils. However, the occurrence of slunted growth of some populations may be attributed to a comparatively high zinc and copper contents in the soils since these two minerals have been found to exhibit a significant though negative correlation with the plant lengths of the various populations of I. dixitei.

-,-, LEGUMINOUS TREES, HAPLOS PORELLA, CENTRAL INDIA

162. VERMA (R.K), JAMALUDDIN and SONI (K.K). Dieback of leguminous trees in young plantations caused by Haplosporella in Central India. The Indian Forester. 123, 7;1997, Jul; 852-55.

The article describes that a dieback disease caused by haplosporella bacteria ha in Acacid hilotica and H. beaumontiand in Albizia lebbek and Pongamia pinnata is reported in young plantations (1-5 years)of leguminous tree species from Central India. The

disease caused 25.5%, 20.8% and 11.3% damage in Acacia nilotica Albizia lebbek and Pongamia pirmata respectively.

-,-, MAGNITUDE, SAL FORESTS

163. PANDE (P.K). Comparative vegetation analysis and sal (shorea robusta) regeneration in relation to their disturbance magnitude in some sal forests. Tropical Ecology. 40, 1; 1999, Summer; 51-61.

The article describes the aimed to compare the vegetation of sal forests of Doon Valey and relate the magnitude of disturbance with the quantification of vegetation, their resource apportionment and thus the regeneration of sal. The whole area is divided into five sites as per their disturbance magnitude (Phanduwala-I; Lachhiwala-II; Balandiwala-III; Jhajhra-IV and Timili-V). Total Dosal area (cm^2 100 m^2) ranged in between 2324-3775 for trees; 74-354 for shrubs and 1.28-30 for herb species at different sites. The range for diversity index (shanon-Wiener Index) was 0.89-2.31 for trees; 087-1.99 for shrubs and 0.64-2.34 for herbs. Diversity index was invariably higher for herbs followed by shrubs and

trees. It is noticed that not only disturbance and stand age affect the sat regeneration due to invasion of new competitors at seedling and sampling stage but the compactness of the stand due to presence of old and big trees also reduce it by increasing moisture status of the soil at the moist areas.

-,-, MANGROVES, EVALUATION

164. BLASCO (Francois) and AIZPURU (Marie). Classification and evolution of the mangroves of India. Tropical Ecology. 38, 2; 1997, Winter; 357-74.

The article describes the ecological status of the mangroves of India is extremely complex due to diversity of coasted bioclimatic, geological and sociological conditions (5.686 km of coast line). Nevertheless an attempt to produce a preliminary classification of the mangroves (about 300 km^2 of woody types) has been carried out in this paper. It is based on simple structured and floristic criteria. Most remaining mangroves are degraded or very degraded. However, the perception of the value of these ecosystems has changed and new technologies

are implemented in order to control their evolution and uses, and to increase a scientific knowledge.

-,-, MEDICINAL PLANTS, ANDHRA PRADESH, case study

165. VEDAVATHY (S). Case study of Decalepis hamilfonii (NTFP) an important medicinal plant of Andhra Pradesh. Minor Forest Products News. 9, 2; 1999, Apr-Jun; 9-10.

The article describes about the case study of Decalepis hamiltonii (NTFP) clearly reveals that there are many constraints and areas of action needed for development of NTFPs. Some constraitns as neglect of scientific management and conservation strategies. In appropriate and sustainable harvest methods, lack of integration in forest management and some areas of action as assessment of NTFP resources by appropriate categories, enhance planning for integrated forest anagement, domestication for forest conservation and improved production.

-,-,-, CHEMICAL INVESTIGATION

166. DAYAL (Rameshwar). Chemical investigation of medicinal plants. The Indian Forester. 123, 3;1997, Mar; 249-55.

The article shows his existence on this planet man has had to depend on nature for sustenance and survival. Medicinal plants have been used by him to keep himself healthy. According to the studies on ethnomedicine and folk medicine about 2000 species are newly identified as drug fielding plants and are well known for their use in about drug industries of various Indian systems of medicine. Phytochemical examination of a number of them has been carried out and active ingredients, isolated identified are being currently used as drug. Chemical examination of hitherto unexplored medicinal plant will help in discovering new drugs.

MENSURATION, TREE GROWTH DIAMETER

167. SRIVASTAVA (V.K), RAJ (A.M), DIXIT (R.K), OZA (M.P) NARAYANA (A) and MURTY (E.S). Significance of tree crown diameter in forest mensuration. The Indian Forester. 124, 12;1998, Dec; 1001-09.

The paper described mean crown diameter

showed significant correlation with mean tree volume in man-made (Teak and Sal) and natural (dry and moist deciduous) forest. The value of correlation coefficient ("r") between mean crown diameter and mean tree volume was close to the value of "v" between DBH and mean tree volume. Regression equations were also developed and the predictive performance of the equations evaluated. It was concluded that mean crown diameter may be used to estimate mean tree volume in the above type of forests, as the growth of the tree is also reflected in the growth of the crown spread. Hence, it may be a good measure to estimate tree volume. It is therefore suggested that mean crown diameter may also be considered on important parameter in forests mensuration.

-,-, MORUSALBA, BIOMASS PRODUCTION, DOON VALLEY

168. CHARAN SINGH, AGRAWAL (M.C), NIRMAL KUMAR and PURI (D.N). Biomass production of Morus alba under different management practices of degraded bouldery riverbed lands of Doon Valley. The

Indian Forester. 124, 3; 1998, Mar; 252-60.

The article shows the leaf production from Morus albal, tree is fully appreciated in hill region for rearing silk work. The leaf can be obtained through various management practice. Since sporadie information is available on the prdouction of leaves under various management practices which is required for optimum sustainable production without damaging the growth of the trees, studies on Morus alba were conducted to establish a suitable prediction model of leaf and total brain wood yield under three different management practices i.e. copping, pollarding and looping on bouldery riverbed soils of Doon Valley. The studies showed that the third degree polynomial was found to be most suitable prediction for leaf and total branch wood in all the three management practices. The leaf production was maximum under pollarding management practice while total branch wood yield was maximum under coppicing.

-,-, NEEM SEED, EXTRACTS effect of

169. SRIVASTAVA (K.K), GUPTA (P.K) and MISHRA (D.K). Effect of neem seed kernel extracts on spermoplane fungi of neem (Azadirachta indica) seed. The Indian Forester. 124, 12; 1998, Dec; 1047-51.

The article shows the effect of three isolates from Neem Seed Kernel Powder (NSKP) was studied on the seed of Azadirachta indica A. Juss (Neem) collected from both viz., summer stored at ambient and low temperature) and winter fruiting seasons. Significant effect of various extracts was noticed even at 0.2 percent concentration. However, methanol and water soluble extracts showed better results than MeOH-water extract against spermoplane fungi of Neem seed.

-,-,-, KERNELS, NEEM BITTERS, EXTRACTION

170. ANAND AKHILA and SRIVASTAV (Meenu). Simplified extraction and estimation of 'Neem Bitters' from neem (Azadirachta indica) seed Kernels. The Indian Forester. 124, 12; 1998, Dec; 1020-24.

The article describes pure water extract of neem seedKernels been found to contain good

amounts of 'Neem Bitters' which possess insect growth retrading activity. Optimum ++ PLC conditions havebeen established for estimation of 'Neem Bitters' in such water extract.

-,-, NUTRIENT CONCENTRATION

171. GARG (V.K). Litter production and nutrient concentration under high density plantation in some fuelwood species grown on sodic soils. The Indian Forester. 123, 12; 1997, Dec; 1155-60.

The paper describes an estimate of macro-nutrients and litter production was evaluated in 5 years old plantations of Accacia farnesiana, Acacia nilotica sub sp. euperssiformis and cassia seamed planted at three spacings corresponded to densities of 10, 20 and 30 thousand trees ha^{-1} on sodie soils and Biomass Research Institute, Lucknow, India. The litter yield increased with increasing plantation densities the concentration of macro-nutrients in the leaf litter did notchange due to planting spaces although differencesbetween species existed.

-,-, ORCHIDS

172. SASIDHARAN (N), RAJESH (K.P) and AUGUSTINE (Jony). Orchids of high wavy recollected. Journal of Bombay Natural History Society. 94, 3; 1997, Dec; 473-77.

The article describes the high way mountain for their endemic flora, particularly orchids. Among the 34 orchids reported by Blotter in 1928. Some of them, could not be located and are considered as possibly extinct, mainly due to habitat degradation. This paper deals with 64 species of orchids including all the species reported by Blotter, except chrysoglossum halberii Blott, odohtochilus rotandi folius Blatt, relocated, Bulbophyllum agasty amalaganum Gopalan and Henry is reduced to B. xylopyllum par and Reichb. f. Distribution analysis and relevant notes are provided.

-,-,-, BUXA TIGER RESERVE status of

173. BIST (S.S) and KATHAM (Tapan). Status of orchids in Buxa Tiger Reserve. The Indian Forester. 125, 5; 1999, May; 460-89.

The article shows the Buxa Tiger Reserve (West

Bengal) is very rich in orchids. The survey conducted by the authors during 1994 and 1995 revealed the existenance of at least 144 species (including 5 varieties) of orchids many of which are rare and endangered, 3 species of orchids were found over plantations. 6 species of orchids were also seen over shrubs. As many as 109 species of orchids have been found to be uncommon or scarce within the reserve part of the reserve notified as sanctuary and national park provides protection to only 44 species. Wet Hill forests provides shelter to 63% or orchid species though these are mostly unprotected and affected badly by do lomite mining and illegal cultivation of oranges. Existing forestry practices in the bufer zone also harm orchids suitable suggestions have been made for the long term management and conservation of orchids in the reserve.

-,-, PALM

174. SRIVASTAVA (R.C). The lost palm. The Twilight. 1, 6; 1999, Oct; 45-6.

The article reveals about palm tree which was one of the grandest and most various plants of the

world. It was truly a son of Bangal's soil the only tree strictly peculiar to Bengal. Locally known as Tara, Talier or Tarit Palm, Carypha taliera Roxb, a number of palm family Arecaeceae (Palmae). Although its wild pepaiplations were diminishing, yet it was not uncommon till the beginning of the 19th century in the gardens of Bengal. In 1943 there was no trace of even a single tree outside the Indian Botanic Garden, when was only one mature tree and a few seedlings wer recorded. A report of the existence of one tree in the Singapore Botanical Garden. It appears that this exceptionally handsome and only true Bengali palm tree is no more on this earth.

-,-, PANEX, VEGETATIVE PROPAGATION, ARUNACHAL PRADESH

175. RAO (A.N), HARIDASAN (K) and BISHT (N.S): Vegetative propagation of Panox species (Ginseng) in Arunachal Pradesh. The Indian Forester. 124, 9; 1998, Sep; 702-04.

This paper deals with the cultivation technique of two species of Ginseng viz. Panax Sikkimensis and

P. bipinnatifida. Results of the experiments conducted on the the growth and multiplication of rhizomes by treating them with different harmones such as serootex 03, IAA, IBA and NAA have also been discussed.

-,-, PAULOWNIA, DISEASES

176. MEHROTRA (M.D). Diseases of Paulownia and their management.The Indian Forester. 123, 1; 1997, Jan; 66-72.

The article deals with diseases of Paulowina, an exotic to India, have been studied in the nursery and young plantation and management of the potentially destructive diseases has been worked out. In all fungal diseases and one bacterial diseases have been recorded on this species are damping-off caused by Fusonium sp. of Rhizoctonia solani, leaf spotting and blight by cerospora sp. Pseudocer.Cospora sp. and Corynesporoa cassilcola and leaf blight by p. nicotianae. Both Paulownia species show high susceptibility to Mecoidogyne, the root knot nematods. Use of deoiled neem cala (a) 15 g/per pot is recommended to overcome the nematode problem

in the nursery.

-,-, PLANTATION, impact of

177. VERMA (R.K), SHADANGI (D.K), KUNHIKANNAN (C) and TOTEY (N.G). Impact of plantations in degraded land on diversity of ground flora, soil micro flora and fauna and chemical properties of soil. Tropical Ecology. 40, 2; 1999, Winter; 191-97.

The article reveals ground flora diversity under larger stroemia parviflora and Eucalyptus hybrid plantation raised on bhata lands around Bilaspur (Madhya Pradesh) was studied in September 1997 using standard methods. The number of ground flora species were 12 in both the plantation and 6 in open barren bhata land. Desmodium triflorum and Hyptis suaveolens were the dominant herbs under Largustroemia parviflora and Ecralypters hybrid plantations respectivley. The distribution of ground flora species was random and contagius. The concentration of dominance was lower and index of diversity was higher for ground flora, uder plantations than that of open barren bhata land. However, there was plenty of similarity between two plantation as

far as ground flora under them was concerned. Plantations resulted in restoring soil fertility when available nutrients were raised from low rating to medium / high rating. The population of femge, bacteria, nematodas and VAM fungi spores were more in soils under plantations than control.

-,-,-, NILGRIRI HILLS, effect of

178. JEEVA (V) and RAMAKRISHNAN (P.S). Studies on impact of plantation forestry in Nilgiri Hills of the Ghats on soil quality and nutrient cyeling. Tropical Ecology. 38 2; 1997, Winter; 215-235.

The article describes the biomass, productivity and nutrient cycling patterns between two plantations forests of Euclayptus a lobulus labill and pinus patula schl. and chew were comapred with shala forestsof the Nigiri Hills of the Western Ghats. Distinct differences in soil characteristics and nutrient cycling patterns were recognized. The ecologicalimpact of plantation forestry in the Nigiri hills were evaluated using the Shola vegetation as a bench mark.

-,-, PLANTING METHOD

179. PYARE LEL, RAWAT (G.S) and BISHT (N.S). Nursery techniques of bamboo-standardization of planting method. The Indian Forester. 124, 3; 1998, Mar; 184-91.

The article describes that the vegetative propagation of Dendrocalamus strictus. D. membrances, D hamillonii, Bambusa tulada and B. bambos through seedlings proliferation have been studied by raising the seedlings in nursery beds with a view to reduce the nursery period to obtain massive production of filler / rhizomesin a single phase of separation of seedlings. The results indicated that by separation of sampling through macro-proliferation after a span period of fair months approximately fair times of culms (tillers) and five times of rhizomes are produced in Dendrocalamus strictus, D. membranaeus, D. hamiltonii and Bambusa tulda from mother stock. The performance of Bambusa bambos is even better (5 times of culms and 6 times of rhizomes per sapling were obtained by raising the seedlings in nursery bed by adopting better nursery

practices.

-,-, PLANT GERMPLASM, BIODIVERSITY and STRATEGY

180. CHANDEL (K.P.S). Biodiversity and strategies for plant germplasm conservation in India. Tropical Ecology. 37, 1; 1996, Summer; 21-29.

The article reveals that the cosnervation of biodiversity has attracted world-wide attention in the wake of loss of biological diversity particularly in the gene rich countries of tropical and suptropical regions of the world. Both in situ and exsitu conservation approaches have been integrated. National Bureau of Plant Genetic Resources, following a holistic approach has tried to incorproate both these strategies and India's first National Gene Bank for preserving germplàsm diversity of agri-horticultural crops was established in 1985 and National Facility for Plant Tissue Culture Repository (NFPTCR) has also been established at NBPGR. Several new approaches such as preservation of cell, suspension culture CS, meristerna and shoot tips, embryos, allowing embryonic axes are currently

utilized allowing conservation and sustainable utilization of germplasm resources.

-,-, PLANT RESIDUE impact of

181. HEMA SINGH, SINGH (S.K), SINGH (A.N) and RAGHUBANSHI (A.S). Impact of plant residue quality on the size of the principal biomass pool and net N-mineralization. Tropical Ecology. 40, 2; 1999, Winter; 313-18.

The article describes that the experiment was designed to evaluate the effect of the quality of different plant residues on the microbial biomass and net nitrogen mineralization in dry land rice paddy soil. Soil organic C. total N and total P ranged from 0.72 to 1.18%, 0.08 to 0.12 respectively. After two annual applications of residue there was a 34% increase in soil 'c' with wheat straw treatment and 13% increase with mixed herbage treatment. Totals oil N was not significantly affected due to straw and mixed herbage treatment. The highest and lowest net nitrogen mineralization occurred in leguime and control treatments respectivley. Microbial biomass C,N and P were highest in the straw treatment and

10 west in control soil. Long term affect on soil fertility may be maximum due to mixed herbage input as its application not only resulted in significant increase in nitrogen availability but also increased soil organic matter reserve.

-,-, PONGAMIA PIERRE, SEASONAL VARIATION

182. PALANISAMY (K) and PRAMOD KUMAR. Seasonal variation on adventitious rooting in branch cuttings of Pongamia Pierre. The Indian Forester. 123, 3; 1997, Mar; 236-39.

The article describes the seasonal influence of auxins (IAA, IBA, NAA) on adventitious root formation in the cuttings of Pongamia pinnata was studied 800 ppm IBA induced 100% rooting and more number of roots in march. Exogenously applied auxins are sensitive to active the cambium resulting adventitious root formation in a particular season probably when the cambium is in active phase.

-,-, POPLARS, FERTILIZER

183. GANGOO (S.A), MUGHAL (A.H) and MAKAYA (A.S). Fertilizer response by two species of poplars on initial growth parameters. The Indian Forester. 123, 3; 1997, Mar; 240-44.

The paper deals a study on the growth behaviour of the polar species namely popular deltivides and populus nigra by giving different doses of fertilizers. The results indicate that M_{150} P_{120} M_{20} is the best dose for populus wgra for obtaining optimum height. Individually phosphorous and Nitrogen icnrease the height and diameter of both the species but there is no effect of fertiliser on root-shoot ratio and number of roots / plant in both the species.

-,-, POPLUS DELTOIDS

184. CHAUHAN (Luxmi), RATURI (R.D) and GUPTA (Sangeeta). Studies on anatomical variations in different clones of Populus deltoides. The Indian Forester. 125, 5; 1999, May; 525-32.

The article describes that anatomical parameters of wood quality such as fibre

characteristics vessel frequency and diameter and proportion of tissues were growing in plantations. Statistical analysis were conducted to determine clonal variations and effect of age on anatomical properties. The analysis indicated significant clonal variations and speciic gravity, fibre length and vessel length, fibre diameter, lumen diameter, vessel frequency and vessel diameter. The specific gravity, fibre length and vessel length also show an increase with age. The specific gravity has been found to be positively correlated with fibre length in all the clones but with vessel diameter only in 4 clones. A comelation was also observed between vessel area and specific gravitycell type percentage was not found to be significant different among clones but increase in fibre percentage is found to be related to the decrease in vessel percentage. The variation in wood quality parameters studied offer possibilities for selection of breeding stock with desirable wood quality.

-,-,- MARSH, FIVE CLONES, CENTRAL INDIAN CONDITONS

185. SHARMA (Sandeep), RAWAT (P.S), GERA (Mohit) and PANT (N.C). Leaf-shedding and emergence pattern in five clones of populus deltoides marsh under Central Indian conditions. The Indian Forester. 124, 12; 1998, Dec; 1025-31.

The article newly introduced five cloners of Polar (Populus deltoides Marsh) from Northern India to Central India, were studied for their leaf shedding and emergence behaviour during winter and spring seasons. The clones namely G-3, G-48, D-121 and 37-CI remained in complete leafless condtion for 2, 5, 7, and 6 weeks respectively. The leaf emergence in these clones strated in first week of Marsh and rapid leaf formation was recorded in subsequent weeks during March and April. The clones 65/27 maintained its evergreen status under Central Indian conditions with minimum number of leaves during the months of January and February. These observations suggested the existence of a very short deciduous period in all the clones under central Indian

conditions. It has been further suggested that the deciduous conitions has definite role in deciding the suitability of the clones under tropical conditions of central India.

-,-, PRESERVATION, PLOT, FOREST VEGETATION, analysis of

186. VERMA (R.K), TOTEY (N.G) and GUPTA (B.N). Analysis of forest vegetation in the permanent preservation plot of Tamna in Orissa. The Indian Forester. 123, 11; 1997, Nov; 1007-16.

The article reveals that shorea robusta is dominant in preserved and unpreserved area having maximum IVI, density, frequency and abundance. The higher value of diversity index in preserved plot than unpreserved one indicates more stable community in the preserved plot. The distribution of tree species in this forest is characterised by random and regular distribution. The population structure of tree species in represented mainly by two patterns. One patterns is represented by greater proprotion of individuals in seedling stage indicating frequent reproduction. Another pattern indicates individual's in intermediate

girth classes, wherein disturbances prevent regeneration thereby absence of seedling. It such a trend continuous for longer period, these species may disappear from thin area in near future.

-,-, PROSOPIS JULIFLORA

187. GOEL (V.L), DOGRA (P.D) and BEHL (H.M). Plus trees selection and their progeny evaluation in prosopis juliflora. The Indian Forester. 123, 3; 1997, Mar; 196-205.

The article shows the plus tree selection were made from a 5-year old productivity trial of Prosopis juliflora established on alkaline soil site. Twenty one plus trees were selected on the basis phonetypic superiority in growth, tree form and disease resistance. Minimum selection standard in terms of superiority percentage was 20% for height and 35% for diameter. Single half sib progeny test of selected plus trees along with control was laid in nursery. Six families out performed the rest as well as cotnrol both in respect to their height and collar diameter. Out of the six, three outstanding single tree progenies examined in field trial along with a check

lot showed adaptive growth different among and within progenius. All the selected families out performed the base population as well as the check lot. The study revealed that considerable guins can be achieved in P. juliflora if life genotypes are selected multiplied and used in afforestation programmes.

-,-, PULP WOOD, PINUS TECUNUMANII, production of

188. TORVI (R..K), KARIYAPPA (G.S) and SATISH CHANDRA (K.M). Effect of initial spacing on production of pulpwood in pinus Tecunumanii. The Indian Forester. 124, 3; 199, Mar; 192-97.

The article describes to determine the optimum spacing that gives maximum production of highest quality pulwood in the shortest time, a spacing trial was established in Pinus tecunumanii during 1988 using 1m x 1m, 2m x 2m, 2.5m x 2.5m, 3m x 3m, 3.5m x 3.5m, 4m x 4m and 5m x 5m spacings. Data collectd upto end of 8th year are presented in this paper. Analysis of data indicated that height was not affected by different spacing while diameter at

breast height (DBH) was highest at widest spacing and lowest at closest spacing. Height to DBH ratio decreased with increase in spacing indicating a lower Form-Factor at wider spacing. Considering volume production and distribution of trees in different diameter classes, maximum production of pulpwood is anticipated at 2.5m x 2.5m spacing which gives a planting density of 1,600 plants per ha at the rotation period of 12 years.

-,-, QUERCUS LECECOTEN, DOON VALLEY

189. CHARAN SINGH, VISHWANATHAN (M.K), NIRMAL KUMAR and AGARWAL (M.C). Growth, survival and mean annual increment of Quercus Lececoten chophora (Ban Oak) on degraded lands of Doon Valley. The Indian Forester. 124, 9; 1998, Sep; 732.

The article describes Quercus leucotrichopera (Bank Oak), is most suitable tree species for protective and productive purpose in the degraded lands of higher altitude of north-west Himalayan region. An attempt has been made to explore the possibility of its growing in the lower attitude i.e. in the deraded lands of Doon Valley so that its large

scale plantation can be taken up when soil and water conservation measures are to be carried out on priority basis. On the basis of survival, height, collar diameter and diameter at breast height performance from 1986-1994, it is possible to grow it on degraded lands of Doon valley. Moreover, its growth performance in degraded lands are quite encouraging. The regression equations between plant age with individual growth character (i.e. height or collar diameter or diameter at breast height) were also estimated.

-,-,-, and PINUS TREE, PITHORAGARH

190. UPRETI (D.K) and CHATTERJEE (S). Epiphytic lichens on Quercus and Pinus trees in three forest stands in Pithoragarh district, Kumaon Himalayas - India. Tropical Ecology. 40, 1; 1999, Summer; 41-9.

The paper deals with epiphytic lichen flora of Quercus and Pinus tree from three forest sites in Pithoragarh district of Kumaon Himalyas. Quercus semecarpiflora at attitude between 2700-3000 m has 24 species, while Q. dilatata at the same elevation

has 15 species of lichen. Both the free species have dominance of Usnea and Ramalina species. Qleucotrichophora at lower elevation between 1600-1800 m has 14 species of the same. The only Kherah species of Pinus in the area, Pinus roxburghii between an attitude of 1500-1600 has 21 epiphytic species. Both Quercus and Pinus at lower elevations exhibit dominance of Parmelia. A comparative account of lichen flora thriving on Quercus, Pinus, Acer and Juglans trees as also presented.

-,-, REGENERATION LOSS, SOUTH GUJARAT

191. VERMA (A.K). Estimation of regeneration loss due to forest fire in south Gujarat forests. The Indian Forester. 125, 5; 1999, May; 445-51.

The article shows an attempt has been made to estimate the value of regeneration loss due to forest fire in south Gujarat. The total loss is Rs (1440+810) x 3.07 per ha i.e. Rs. 6907 per ha every year, an annual loss of regeneration worth Rs. 1066 million is being incurred in the forest of south Gujarat. Thus a case for increase of fund allocation for fire protection and quality important is evidently

modernisation of fire control methods.

-,-, RICE, ACACIA NILOTICA, PRODUCTION

192. PANDEY (C.B) PANDEY (K.S), PANDEY (D) and SHARMA (R.B). Growth and productivity of rice (oryza sativa) as affected by Acacia nilotica in a traditional agro forestry system. Tropical Ecology. 40, 1; 1999, Summer; 109-17.

The paper describe the effect of Acacia nilotica tree (> 12 year) on the growth and yield of rice (oryza salina) was evaluated in 29 stands in a traditional agro forestry system in a sub-humid tropical region. The tree crown reduced the intensity of light by 8.5 times at 2m and 1.6% at 8m distance, above ground biomass, below ground biomass, above ground biomass / below ground biomass ratio and yield of the rice were positively related to distance. The rice plants responded to the intensity of light differently for their growth and yield parameter, and thereby the parameters reached stability at different distance from the tree trunk. The tree canopy reduced the density, above ground biomass, below ground biomass, above ground biomass / below

ground biomass ratio and yield, an average across the distance, by 27.5%, 27.5%, 19.1%, 14.8% and 24.9% respectively. However regression analysis of normalised mean value of the parameters indicated that above ground parameters (density, shoot biomass and grain yield) were affected greater compound to that of root biomass.

-,-,-, PRODUCTION, CLIMATIC CHANGE, role of CHATTISGARH

193. CHAUDHARY (J.L) and SASTRI (A.S.P.A.S). Regional climate change and climatic swings with special reference to production of rice and water resource potential in Chattisgarh region of central India. Tropical Ecology. 40, 1; 1999, Smmer; 137-44.

The article gives in the Chattisgarh region of Central India, rice is grown in about 3.8 million hectare area of which more than 80% is rainfed. The average productivity of rice in the region is about 1.2 ha^{-1} which is very low. The study on storage index attempts to understand the harvesting potential of the Chattisgarh plains region in different months

which is falling in the recent years during the months of September and October. In the districts like Raipur, Bilaspur and Balaghat. Where there is a significant increase in irregation resources, rice productivity has significantly increased over the decades.

-,-, RINGAL BAMBOO PHENOLOGY, NAINITAL HILLS

194. LODHIYAL (L.S), SINGH (S.P) and LODHIYAL (Neelu). Phenology, population structure and dynamics of Ringal Bamboo (Arundinaria falcata) in Nainital Hill of Central Himalaya. Tropical Ecology. 39, 1; 1998, Summer; 109-115.

The article reveals that investigation on phenology, population structure and dynamics of Arundinaria falcata Nees (Ringal) from April 1984 to April 1985 in Kumaon Himalayas was carried out. The highest values for leaf area increment, leaf dry weight increment, leaf growth create, shoot feight growth and specific leaf area were recorded, respectively in April, November, April, July and March. Population structure indicated inverted

pyramidal shape across all the sampling dates. Of the total notably 92% occurred between April to August. However, the maximum mortality was recorded between August to December.

-,-, SEED GROVES, VEGETATION ANALYSIS

195. RAJENDRA PRASAD (M), KRISHNAN (P.N) and PUSHPANGADAN (P). Life from spectrum of sacred groves - a functional tool to analyse the vegetation. Tropical Ecology. 39, 2; 1998, Winter; 211-17.

The article describes sacred groves have existed in Kerala from time immemorial as patches of densely vegetated areas set aside on religious grounds and are distinct and uinque in their biological diversity. Population pressure have led to exponentially increasing demands for natural resources resulting in the decrease in the area of these self generating and self sustainable ecosystems. In the presnet paper, the life forms of the angiosperms belogning to 86 families, 247 genera and 318 species have been studied. The similarity between the Raunkiar's nromal spectrum and sacred grove's spectrum indicates that this vegetation stands as a relic of the evergreen

tropical rainforest. The dominance of phanerophyte and therophyte newal that phyto-climate is therophanenophytic. The biological spectrum of the sacred groves of different bio-climatically divergent regions indicates that this is a potent tool for understanding the general structure and functioning of these ecosystems, especially to analyze the human impact.

-,-, SAND DUNE, THAR DESERT

196. GUPTA (G.N) and BILAS SINGH. Relative performance of different species on a sand dune in Thar Desert. The Indian Forester. 123, 3; 1997, Mar; 206-10.

The paper shows a field experiment was conducted in Jodhpur District of Indian desert to study the performance of different species on a sand dune. Effect of mulching was also studied on six different species. Acacia planifrons registered the highest survival, whereas best growth was attained by Prosopis juliflora (274 cm eight and 339 cm. Crown at two years of age, followed by Acacia forlitis (1237 cm height and 240 cm crown) and Acacia planifornis

(127 cm height and 175 cm crown). Mulching caused dramatic improvements in the growth of ziziphus numularia, tecomella undulata, propsopia cineraria and Acacia tortilis.

197. -,-, SCHUMANNIHNTHUS DICHOTOMA, GROWTH SIDDIQI (Neaz Ahmad), ROWSHON ARA and SYEEDA RAYHANA MERRY. Survival and initial growth of Schumannianthus dichotoma (Marantaceae) from four different propagation materials. The Indian Forester. 124, 12; 1998, Dec; 1014-19.

The article describes Schumannianthus dichotoma is an economically important non-diameter forest species which occur naturally or in plantation in low lying areas of Bangladesh. Survival and growth of four propagating materials namely, rhizomes, branch cuttings, rooted cuttings and seedlings were observed for S. dichotoma. Performance of rhizome, the conventional means of raising plantations, appears to be the best when assessment was made one and half years after initiation of the experiment. Survival was 82.67% and number of shoots per clump was 31.67. Height and diameter of the tallest

shoot were 180.53 cm and 17.31 mm respectively from the rhizomes. Further studies, need to be conducted to us. Certain the practicality and feasibility of other propagating material which are less expensive.

-,-, SEED-ACACIA NILOTICA WILD EX DEL, TETRAZOLIUM TEST

198. GERA (Neelu), GERA (Moit) and PUROHIT (Mamta). Tetrazolium test for the seeds of Acacia Nilotica wild Ex Del. The Indian Forester. 124, 12; 1998, Dec; 1039-42.

The article deals with the standardization of evolution criteria for the terrazolium test ont he seeds of Acacia nilotica willd, ex-del, Chipping of seed coat was found necessary for satisfactory inhibition and staining seeds were soaked in distilled water for 24 hours followed by soaking in 1% TTZ solution and incubated at 30°C in dark for 24 hours. Six staining patterns were recognized. Rest mean square method was applied to determine the viable categories. Three staining patterns represented viable and three non-viable seeds.

-,-, SEEDLINGS, TALL, TECHNIQUES

199. SHIVRAJ SINGH. Technique of raising tall seedlings. The Indian Forester. 125, 5; 1999, May; 455.

The article describes that a new nursery technique was tried to raise tall seedling. This technique has given encouraging results and is summraised in this paper. Use of healthy and tall seedlings is only one of the important factors responsible for the success of avenue planting. Various other technical, managerial and ecological factors are also equally responsible and affect the success. An intense research may further result in improvement in the technique.

-,-, TEAK CLONES, ALLAPALLI REGION, MAHARASHTRA

200. ANMOL KUMAR, GOGATE (M.G), SHARMA (Rajesh) and MANDAL (M.K). Genetic evalution of teak clones of Allapalli region, Maharashtra. The Indian Forester. 123, 3; 1997, Mar; 187-89.

The article describes the availability of first hand basic information on the genetics of important characteristic and on parental combining ability is the

prerequisite for formulation an efficient breeding programme. Information on these aspects derived in teak, tectonagrandis indicated significant genetic variation at the family level. Height recorded both high heritability and genetic gain values. Strong correlation at the genetic level was observed between diameter and basal area. Clones A-16, A-21, and A-35 were found to be best combiners. It is suggested that these clones be used in breeding as well as in advance generation production population in teak.

-,-,-, GENETIC IMPROVEMENT

201. VINOD KUMAR, KOTRANGE (H.R) and DHOTEKAR (U.P). Genetic improvement of teak. The Indian Forester. 124, 9; 1998, Sep; 687-95.

The article describes that genetic improvement of teak has been undertaken under Maharashtra Van Sanshedhan Sanstha, Chandrapur in a systematic manner conducting identification of seed production areas, selection of plus trees, establishment of clonal teak seed orchards and teak seedling seed orchards, establishment of teak germ plasm bank, as well as bud Multiplication Gardens, Progeny testing and

provernance trial. Thus efforts are being taken to produce genetically superior teak trees by making use of principles of plant breeding. The works going on in MVSS, Chandrapur will go a long way in the field of Genetic improvement of teak.

-,-,-, IRRIGATION, performance of

202. BHEEMAIAH (G), SUBRAHMANYAM (M.V.R) and SYED ISMAIL. Performance of teak under different irrigation and fertilizer management practices. The Indian Forester. 123, 12; 1999, Dec; 1171-75.

The article discusses to find out the effects of irrigation and fertilizer practices on growth of teak, study was intiated at Hyderabad as sandy and team soil. After a period of 30 months after teak planting the results revealed that irrigation practices of giving water at 10, 20 and 30 days intervals significantly influenced both the height and girth of teak trees. Irrigation at 10 days (I_1) and 20 days (I_2) intervals resulted in superior taller trees with greater girth during all periods of study, as compared to irrigation at 30 days interval, (I_1) and no irrigation (I_o). The three years old teak trees were 402 m taller and 28.5

cm thicker in I_3 which was on par with I_2 14.66 and 28.04 cm). Though the application of area did not effect the height and girth of teak trees during the periods of study but higher doses of area application i.e. 200 g (N_2) and 300 gl plant (N_2) caused marginal increase in the growth of teak.

-,-,-, PERFORMANCE

203. BHEEMAIAH (G), SUBRAHMANYAM (M.V.R) and SYED ISMAIL. Performance of teak under different irrigation and fertilizer management practices. The Indian Forester. 123, 12; 1997, Dec; 1171-75.

The article describes to find out the effects of irrigation and fertilizer practices on growth of teak, study was intitiated by fly described on sandy loam soils. After a period of 30 months after teak planting the results revealed that irrigation practices of giving water at 10, 20 and 30 days intervals significantly ifluenced both the height and girth of teak trees. The interaction between irrigation and urea application too, was found insignificant. The greater incremental growth both in height and grith during the period (from 21 month to 30 month after planning) was

markedly observed with frequent irregations but not with nitrogen doses.

-,-, TECTONA GRANIDS, EGE, ELEMENT

204. BAGCHI (S.K). Correlations of age-element in Tectona Granids. The Indian Forester. 125, 5; 1999, May; 522-25.

The article analysis of correlation coefficient with the same set of data (i) with age, and (ii) without age (by partialing out the age element) revealed negligible difference on the magnitude of correlation coefficients, indicating that age need not be considered for analysis purposes. However, it has been suggested that though it is not necessary to consider the age element and the raw data can be used as such for multivariate analysis, the standardised data also could be used for the purpose. This procedure is beneficial while utilising the data for classification of plants from natural forests of or plantation origin where age is not known.

-,-, TROPICAL TREE, INDUSTRIAL AIR POLLUTION, response of

205. SAHA (Deepa), GAVALI (Jitendra G) and KRISHNAYYA (N.S.R). Different response of tropical trees towards industrial air pollution. Tropical Ecology. 40, 2; 1999, Winter; 289-97.

The paper includes to determine the difference in the response of tropical evergreen and deciduous trees towards air pollution, three different species belonging to each category were studied. The study was undertaken in field conditions, where the trees were exposed to industrial air pollution. A reference site was selected 25 km away from the industrial area. Glutathione, peroxidase and ascarbic acid (antioxidant pool), total chlorophyll lipid peroxidation, corbohydrate levels were estimated. Differences in the recorded observations between the polluted and control sites were significant ($p < 0.05$). The results indicate a decline in chlorophyll content in trees growing in the industrial area. The amount of photosynthate translocated from the leaves was reduced on exposure to pollutants. The leaf longivity

and shoot growth declined. The evergreens showed higher translocation of photosynthates and continuous growth was observed. Changes in the other observed parameters were moderate.

-,-, WOODY LITTER, WEIGHT LOSS, and NUTRIENT COMPOSITION, CENTRAL HIMALAYA

206. GARKOTI (S.C). Changes in weight loss and nutrient compsoition of woody litter in three forests on high altitudinal zones of Central Himalaya. Tropical Ecology. 40, 1; 1999, Summer; 129-336.

The paper describes the patterns of decomposition and nutrient release from the wood litter were determined using litter bages in four high altitude forest tree species of central Himalaya. The weight loss ranged from 23.5-27.4% after 365 days, the minimum being in B. utilis and maximum in . Cappadoceicum. In both deciduous and evergreen species the rate of decomposition, decreased with increase in attitude. The rates of decomposition were significantly correlated with nutrient concentrations. Of the nutrients studied potassium was released most rapidly.

-,-, WOODY SPECIES, GIR

207. KHAN (Jamal A). Periodicity of major phenophases in woody species in dry deciduous forests of Gir, India. Tropical Ecology. 40, 2; 1999, Winter; 299-303.

The articles gives the phenology of five individuals each of 20 food plants of ungulates in Gir was observed from January 1987 to December 1988. Highest number of plant species (35% of total sampled) dropped leaves during early dry season in 1987 followed by peak leaf inception during the month of April when 40% species grew their pre-monsoon flush. Flowering activity peaked in the month of August and fruting during October. The failure of monsoon in 1987 delayed leaf inception in 1988 and the peak was observed in July. The timing and spacing of phenological events in discussed in the light of a biotic and biotic factors in the protected area.

-,-,-, KALRAYAN HILLS

208. KADAVUL (K) and PARTHASARATHY (N). Structure and composition of woody species in tropical semi-evergreen forest of Kalrayan hills, eastern ghats, India. Tropical Ecology. 40, 2; 1999, Winter; 247-60.

The article reveals that the species richness, density and population structure of all trees and lianae (≥ 30 cm gbh) were inventored in four 1 ha plots of semi-evergreen forest, Kalrayan hills, Eastern Ghats. A total of 2064 stems (mean 516 ha^{-1}) covering 89 species (i.e. 74 genna and 30 families) were recorded. Species richness varied from 42 to 47 species $ha^{-1}m$ Shannon index from 2.31 to 87 and stand density from 367 to 667 stems ha^{-1}. Mean stand basal area was 33.6 m^2 ha^{-1}. Two trees, Mothopegia heyneana and celtis philippensis dominated contribution 50% of total density. Species richness and density decreased with increasing tree girths. The forest stand contained a growing population, but girth frequency considerably varied. In view of habitat uniqueness, human impacts of

cultural tradition, the conservation need is stressed.

-,-, WOODY VEGETATION, SHIVALIKS and OUTER HIMALAYA

209. RAWAT (G.S) and BHAINSORA (N.S). Woody vegetation of Shivaliks and outer Himalaya in north-western India. Tropical Ecology. 40, 1; 1999, Summer; 119-28.

The article reveals the structure and composition of forests the Shivaliks. Doon valley and outer Himalayas in Dehradun district, north-western India were studied using stratified random plots. Richness of woody species. Importance value Index (IVI) of trees, and regeneration of sal, the climax species of the region, have been compared. Based on 'TWINSPAN' analysis 17 groups for tree associations were segregated with Eigen value ranging from 0.216 to 0.729 which largely follow increasingly rainfall and moisture gradient. Absence of Anageissus latifolia in the outer Himalaya marked the difference from the tree associations of other two zones The richness of woody species was highest in Shivaliks (62) followed by Doon valley (56) and outer

Himalaya (54). Tree density in Doon valley (640.0 ± 253.9 ha^{-1}) and outer Himalaya (643.7 ± 257.7 ha^{-1}) were much higher compared to shivaliks. Areas disturbed due to lopping and cutting, particularly in Doon valley and outer Himalaya were dominated by Lantanaca mora Linn and exotic shrub Though Lantana thickets seem to protect sal seedling from the forest and other injuries. Overall plant species diversity was very low in such areas. Influence of terrain, topography and protection has been discussed alongwith the conservation implications.

-,-, YEW, VEGETATIVE APPROACH, HIMALAYA

210. DUBEY (K.P). Himalayan Yew (Taxus Baccata) conservation : A vegetative approach. The Indian Forester. 123, 12; 1997, Dec; 1150-54.

The article deals with the Himalayas Yew is an extremely threatened and medicinally important tree, forth use of its commercial extract of Taxus which is being used as an anti-considering universally. Vegetative propagation of the plant was tried using branch cutting 1-2 cm thick taken from Jageshwar district Almora. The branch cuttings after given dip

treatment using several growth promoting substances (IAA, IBA, Geradix and Seradix) along with control cuttings, in which no treatment was used were planted in raised plateform sand beds in the Mist Chamber. The branch cuttings treated with IBA dip treatment were found to be the best method of vegetative propagation of the species. This will go a long way in the conservation of the commercially important Himalayan species of Yew, alongwith the preservation of its inherent genetic characteristics. -,-, YOUNG, ROBINIA PSEUDOACACIA BIOMASS PRODUCTION

211. SAH (V.K), BANA (O.P.S) and SINGH (Virendra). Biomass production and its allocation in components of young Rabinia psedoacacia. Tropical Ecology. 39, 1 1998, Summer; 125-31.

The article describe the study deals with the biomass production and allocation in young (6 months to 4 years old) Robinio pseu doacacia L. plants. The height, basal grith and drip weight of each component of the plant increased with age. The allocation of current annual drug matter increment

among different components also varied with age. Satisfactory allometric equative relating to biomass of different components with based grith (By) and squard basal diameter x height (bd^2l) mm developed. The intercomponent biomass relationships were also highly significant and the resulting allometric equations carried smaller error than the equation using Bg as the independent variable. The mean annual increment has increased with age and did not equal currentannual increment, indicating the individuals have not attained materiality. Number of root nodules per tree were significantly related to corresponding tree biomass and age.

-,-,YOUNG TEA, PLANTATION, EUCALYPTUS TERETICORNIS SHEITER BELT, effect of

212. GENDA SINGH and TRIPATHI (S.P). Effect of Eucolyptus Tereticornis Shelterbelt on young teak plantation : A case study. The Indian Forester. 124, 3; 1998, Mar; 206-10.

The article describes the results from this study suggested that the growth of teak plants was affected by the shelterbelt and the percent reduction in

growth parameters decrease with increasing distance from the shelterbelt. The explanation for thin is the competitive interaction between the trees in shelterbelt and the teak plants for light as well as for nutrients. This was also suggested by lowest concentration of nutrient concentration of nutrients at 4.0 m was due to their low utilization because of poor growth of the plants along the shelterbelt at this distance.

LIST OF PERIODICALS SCANNED

S.NO.	NAME OF PERIODICALS
1.	TROPICAL ECOLOGY
2.	THE INDIAN FORESTER
3.	JOURNAL OF BOMBAY NATURAL HISTORY SOCIETY
4.	THE TWILIGHT
5.	HIMALAYAN PARYAVARAN
6.	WILDLIFE INSTITUTE OF INDIA
7.	M.F. NEWS (MINOR FOREST PRODUCTS)
8.	ZOO'S PRINT
9.	HAMADRYAD
10.	FORKTAIL
11.	ORYX

LIST OF SUBJECT HEADINGS

WILDLIFE MANAGEMENT - GENERAL

WILDLIFE MANAGEMENT- SPECIAL

PART -3
INDEXES

AUTHOR INDEX

TITLE INDEX